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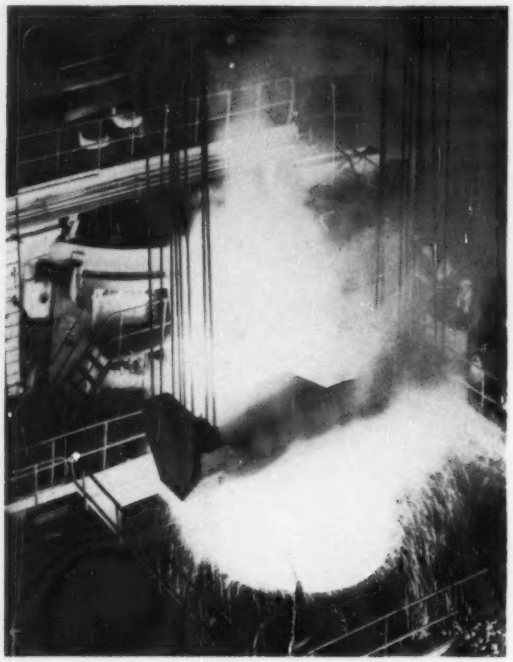
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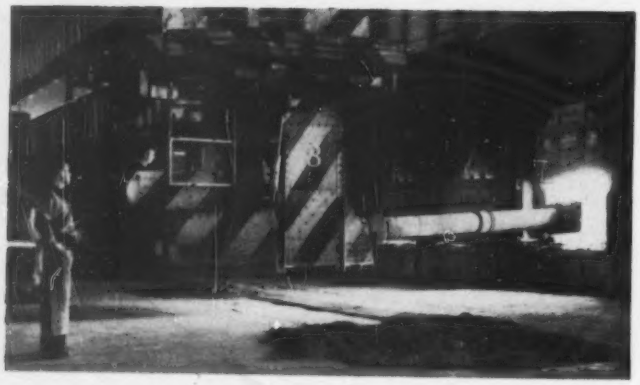


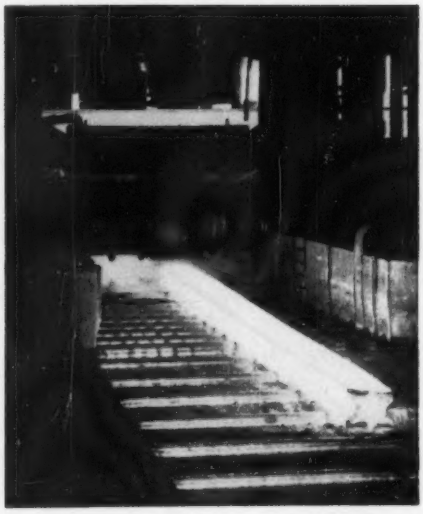
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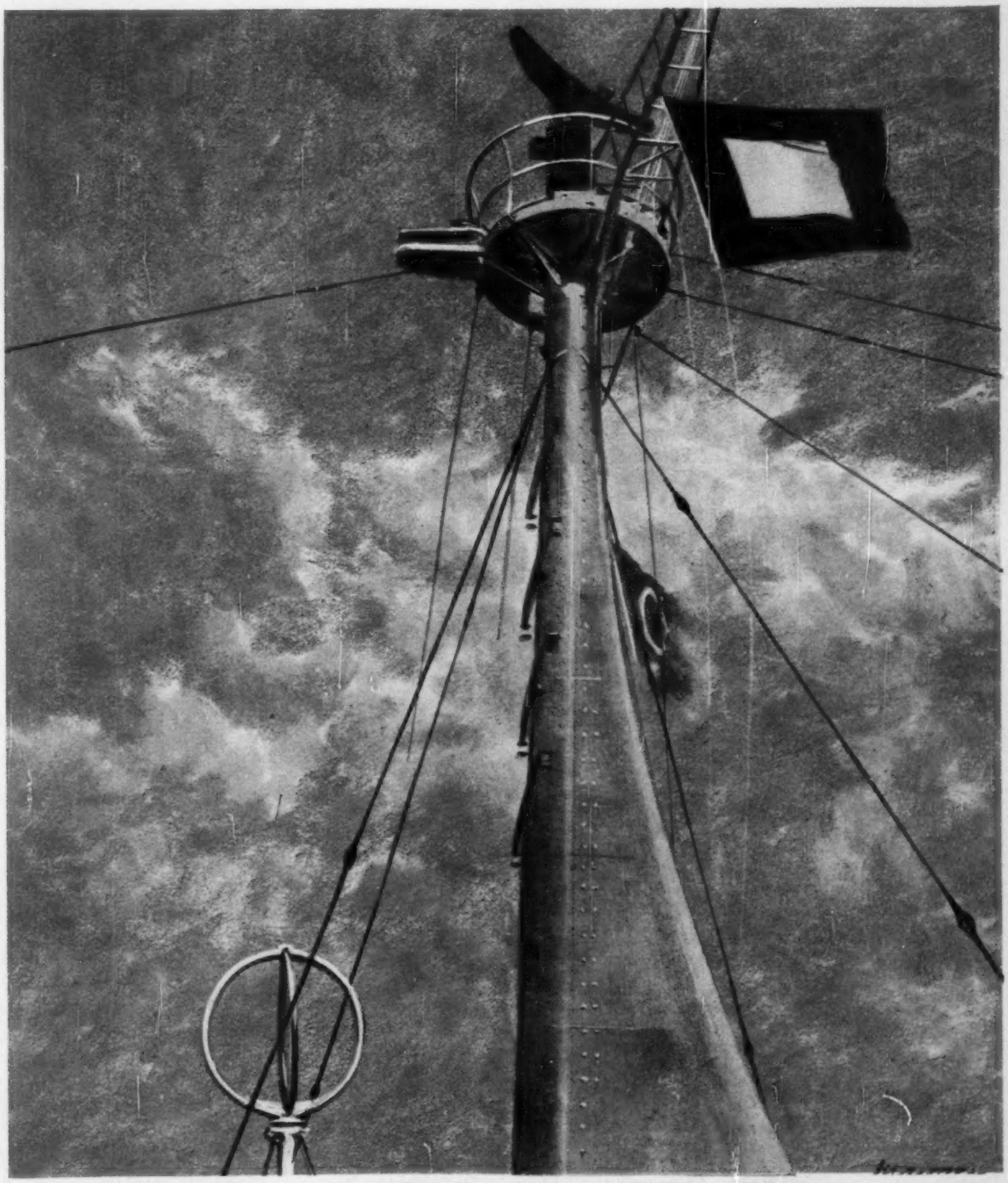


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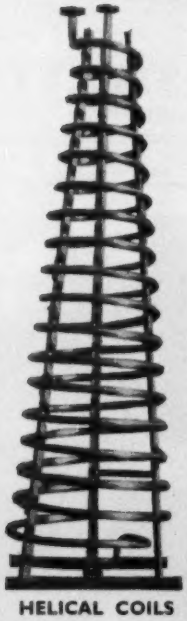
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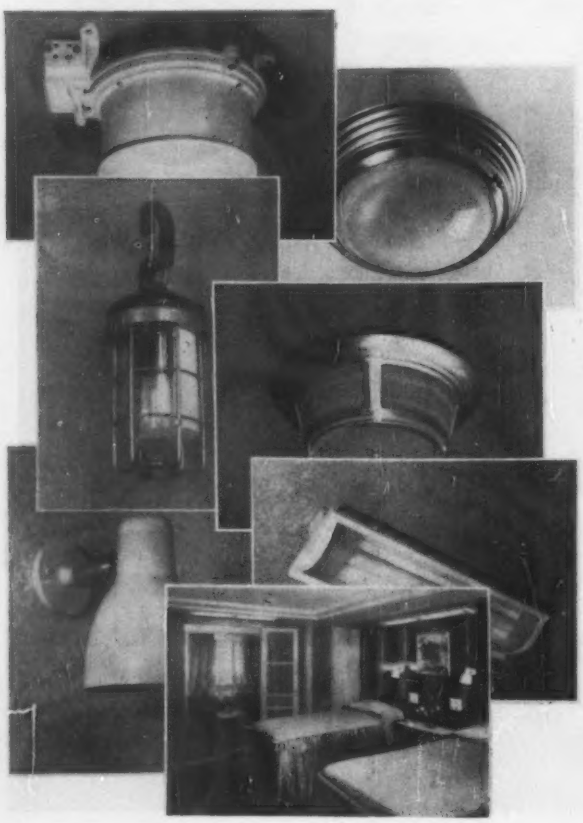


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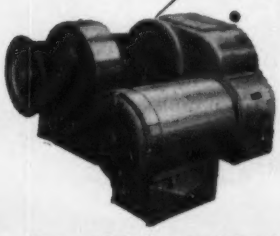
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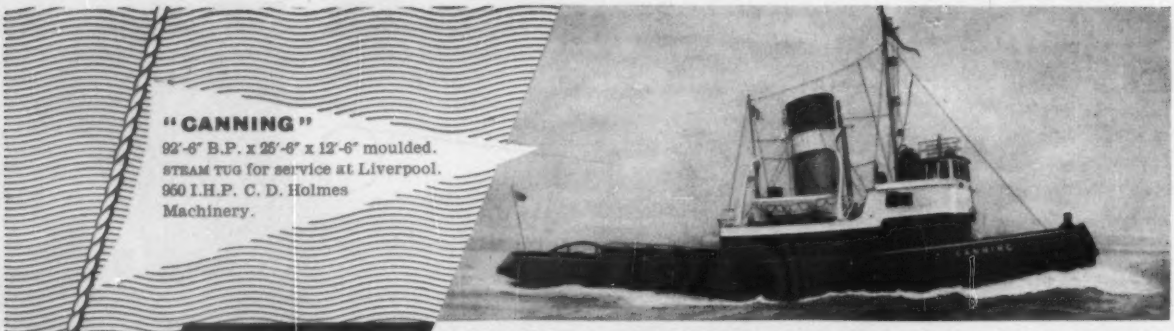


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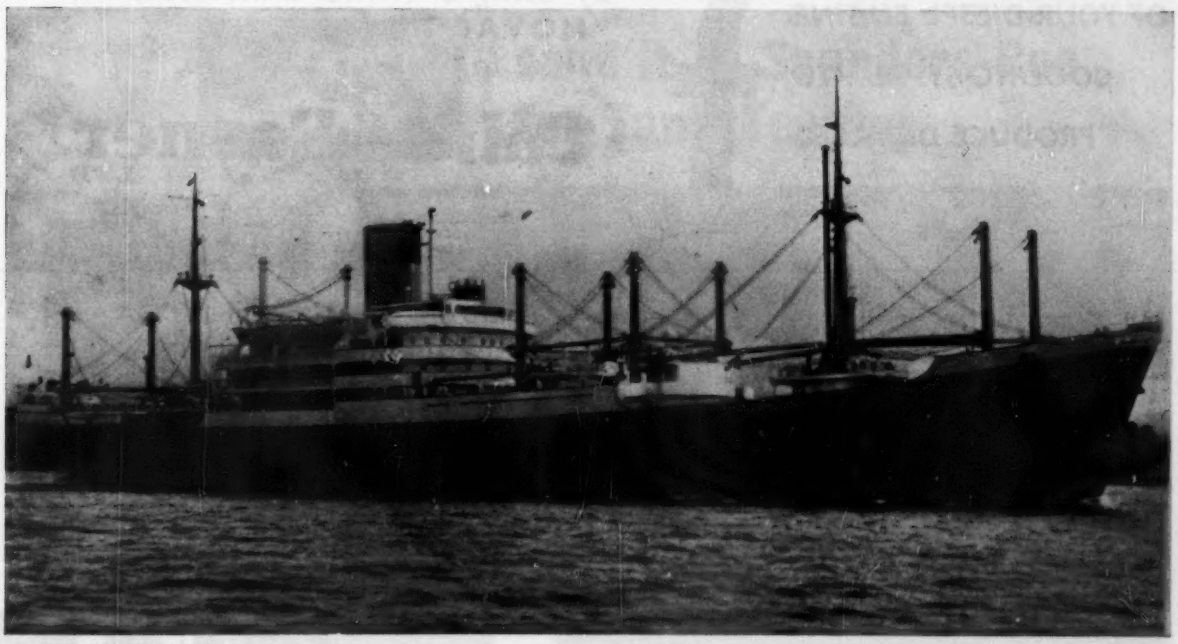


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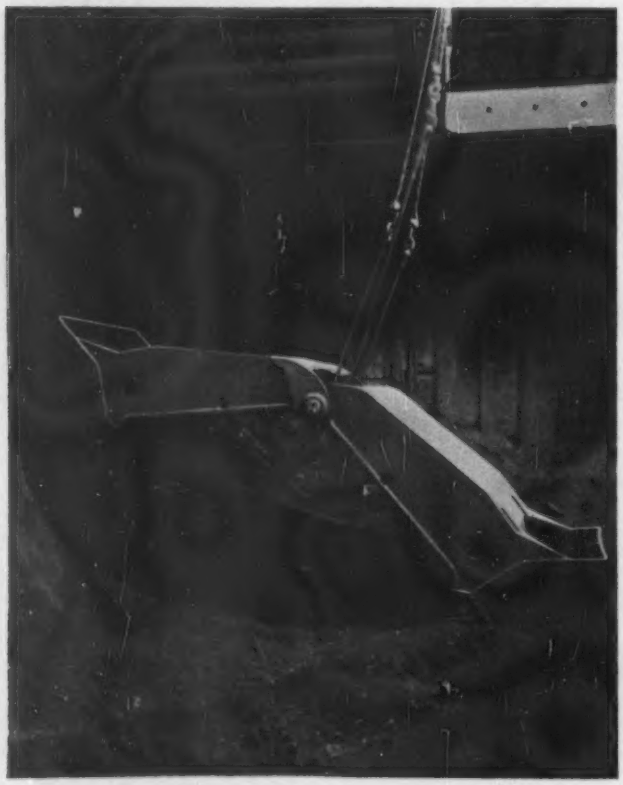
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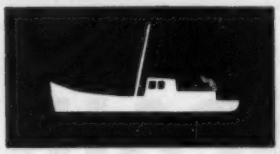
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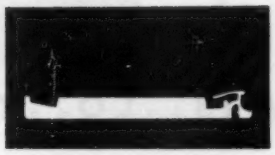
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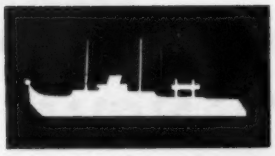
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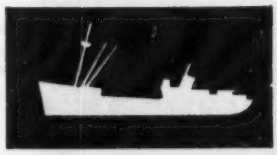
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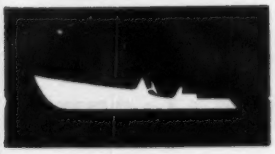


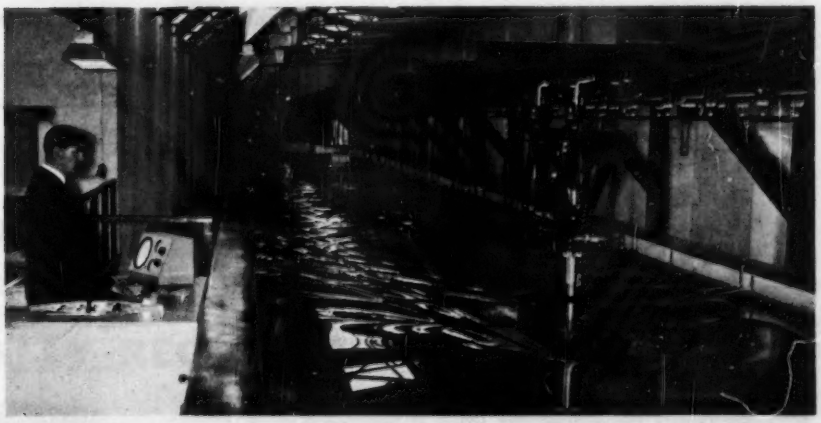
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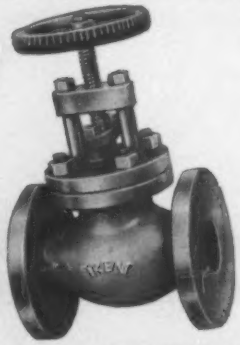


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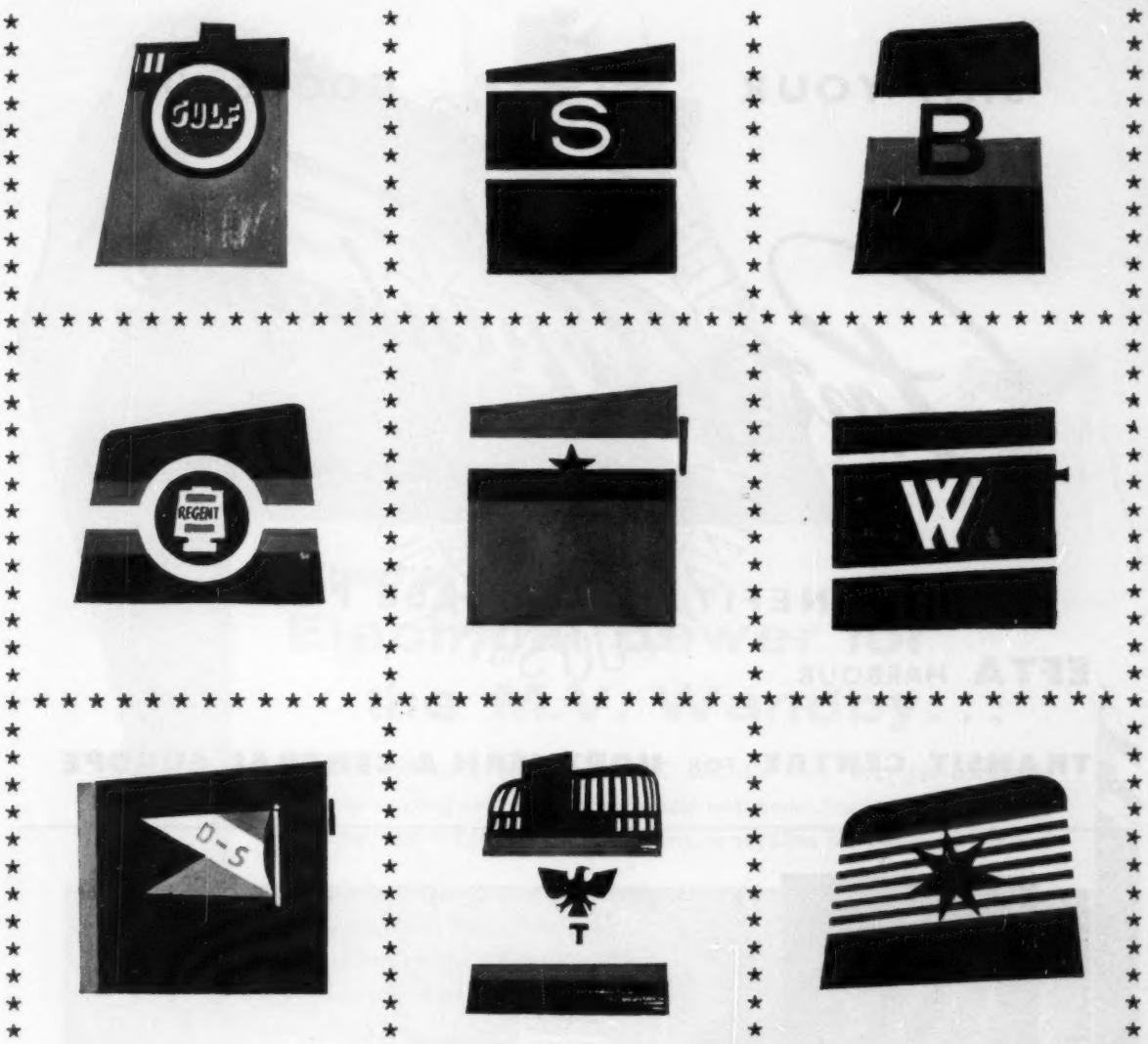


Fig. 399
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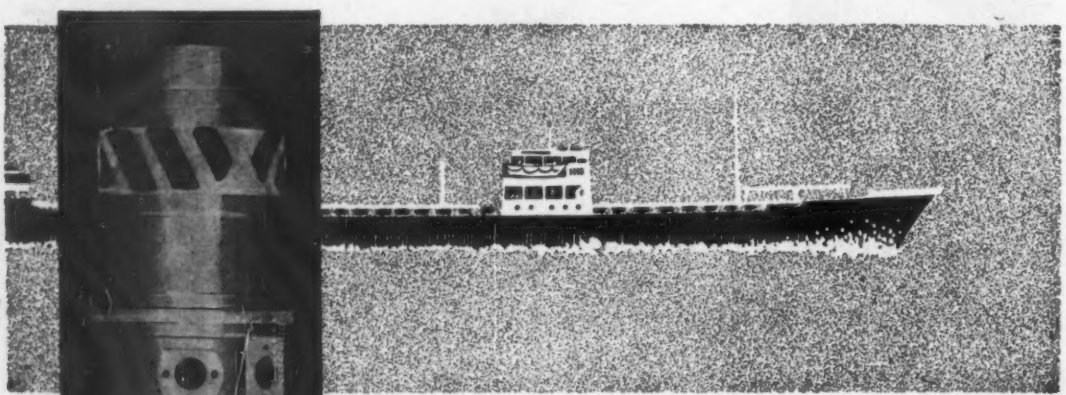
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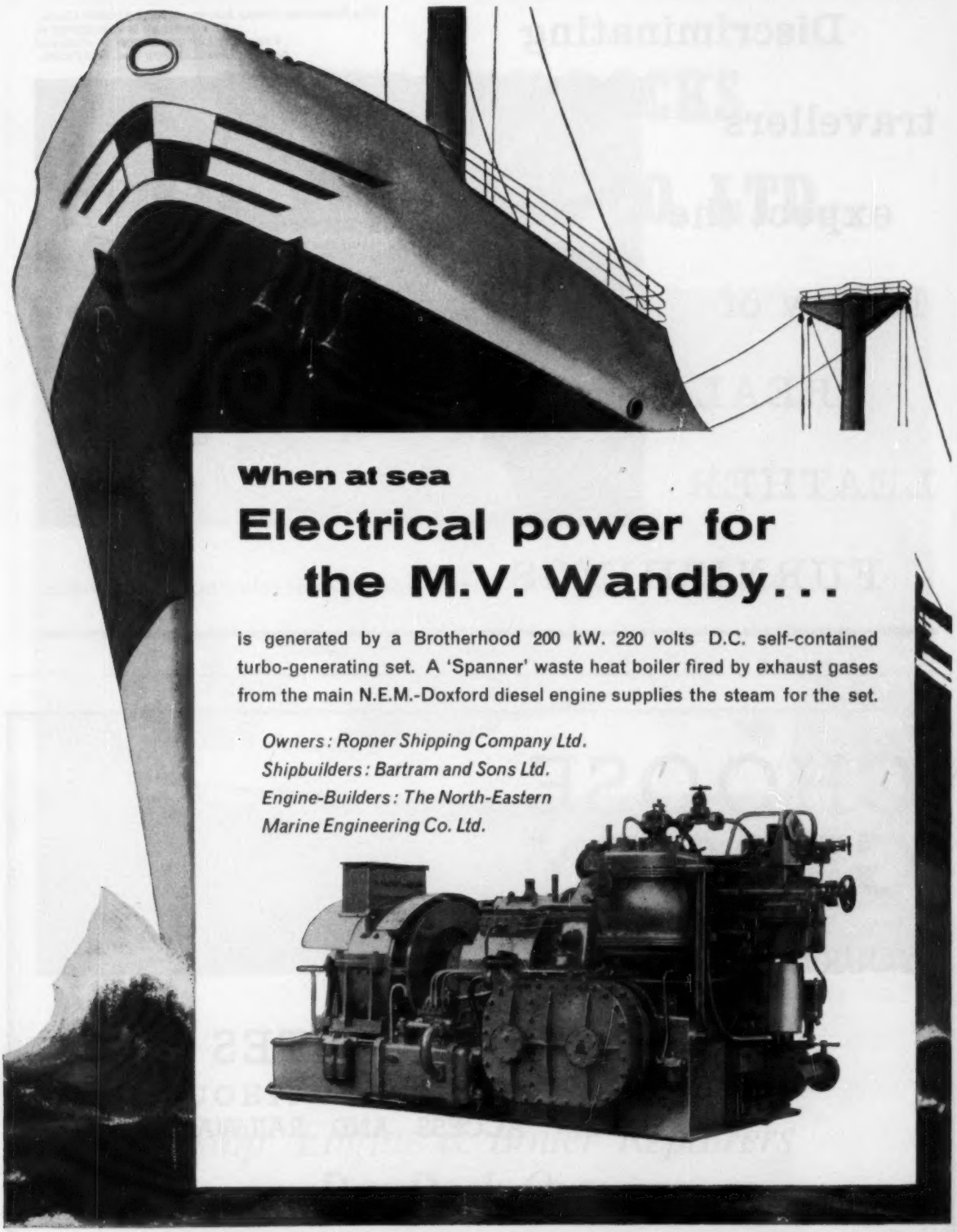
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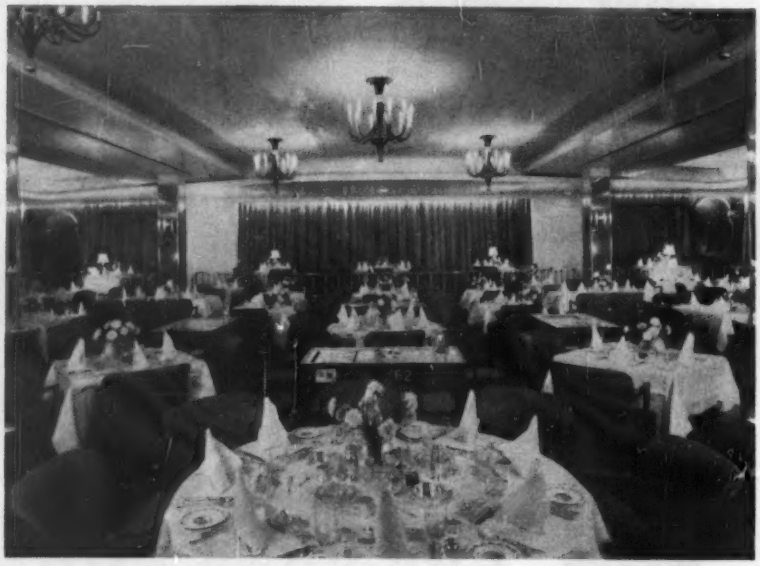
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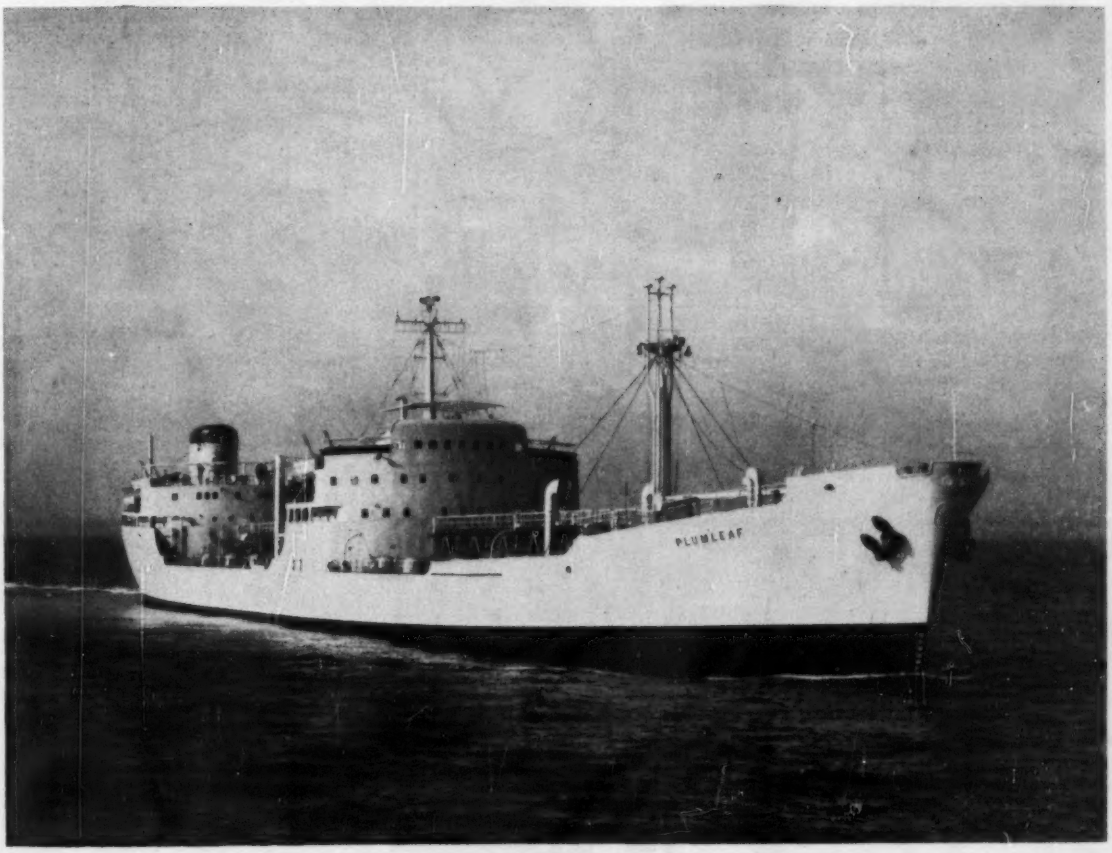
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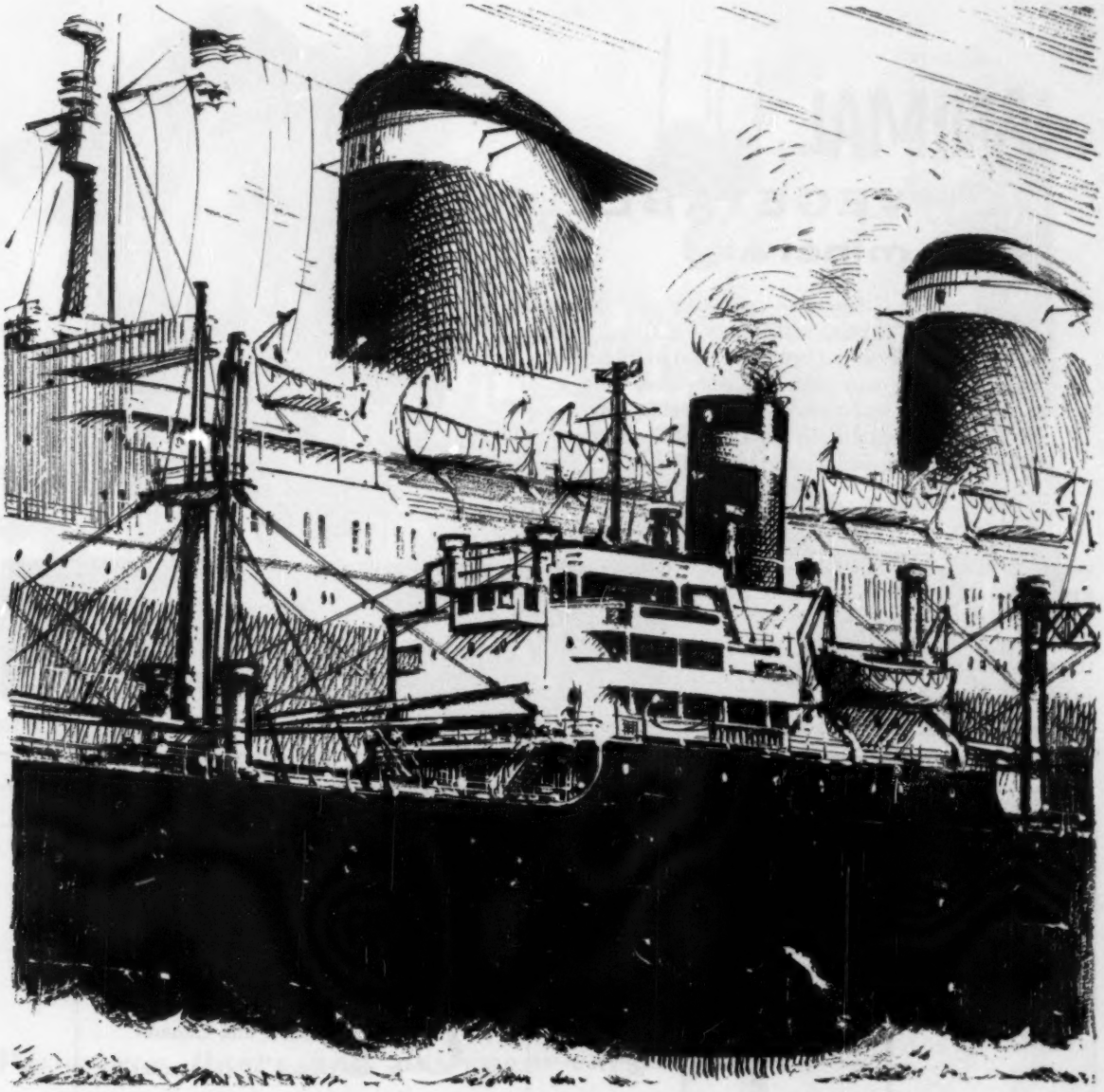
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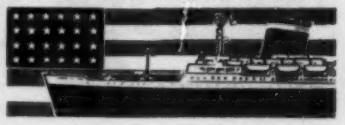
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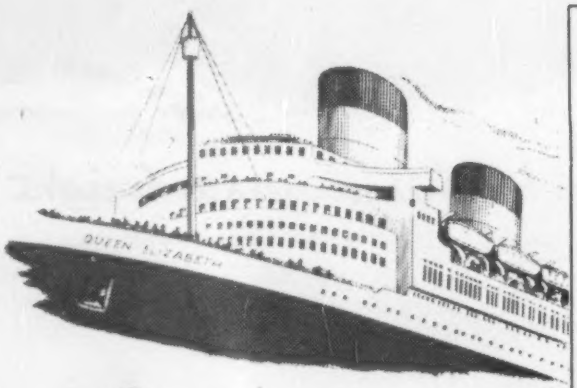
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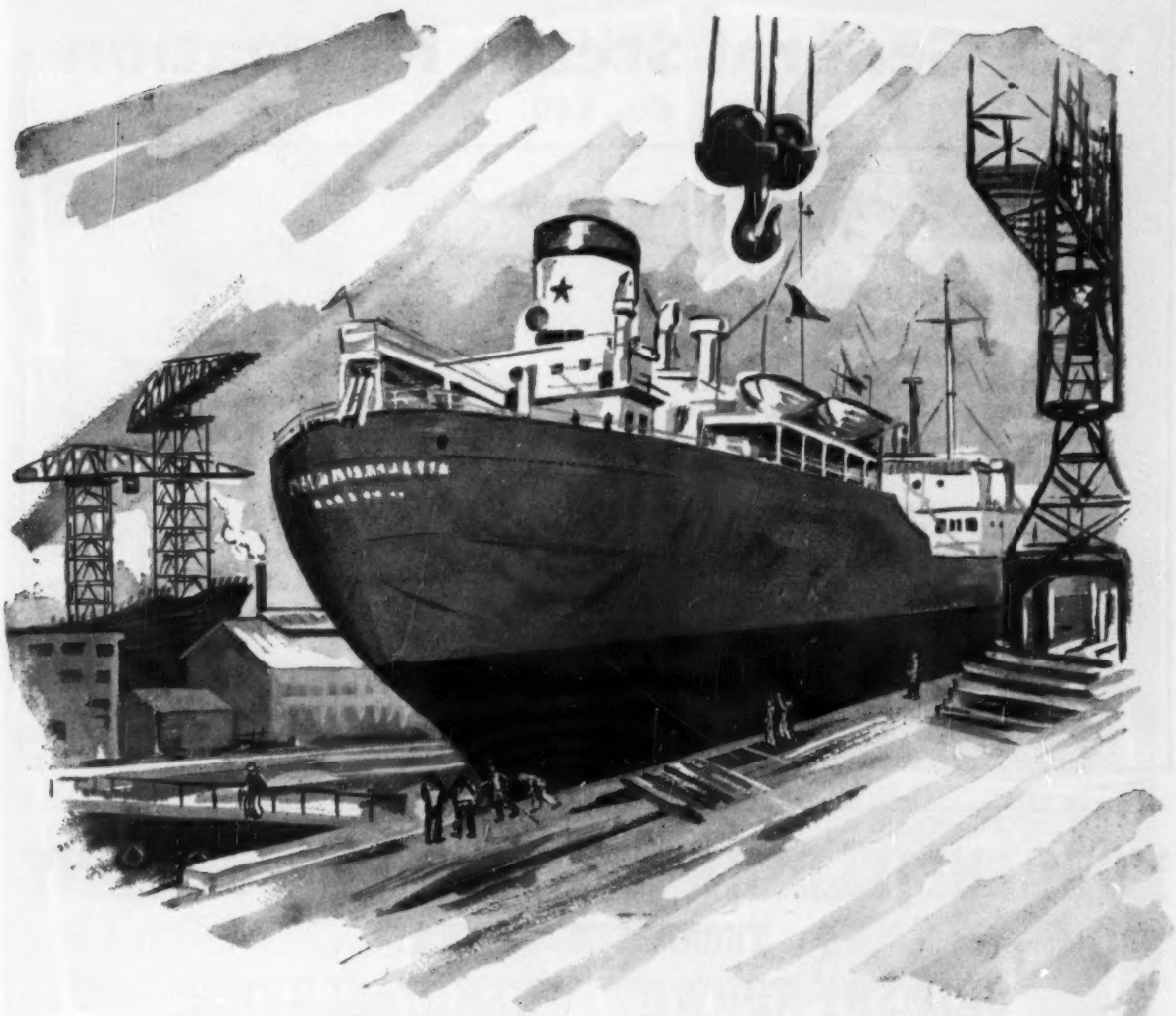
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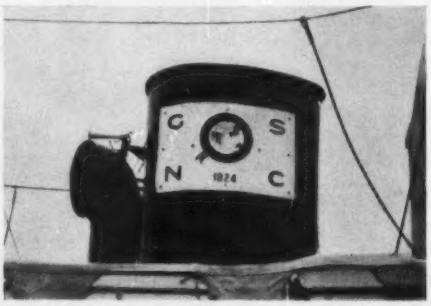
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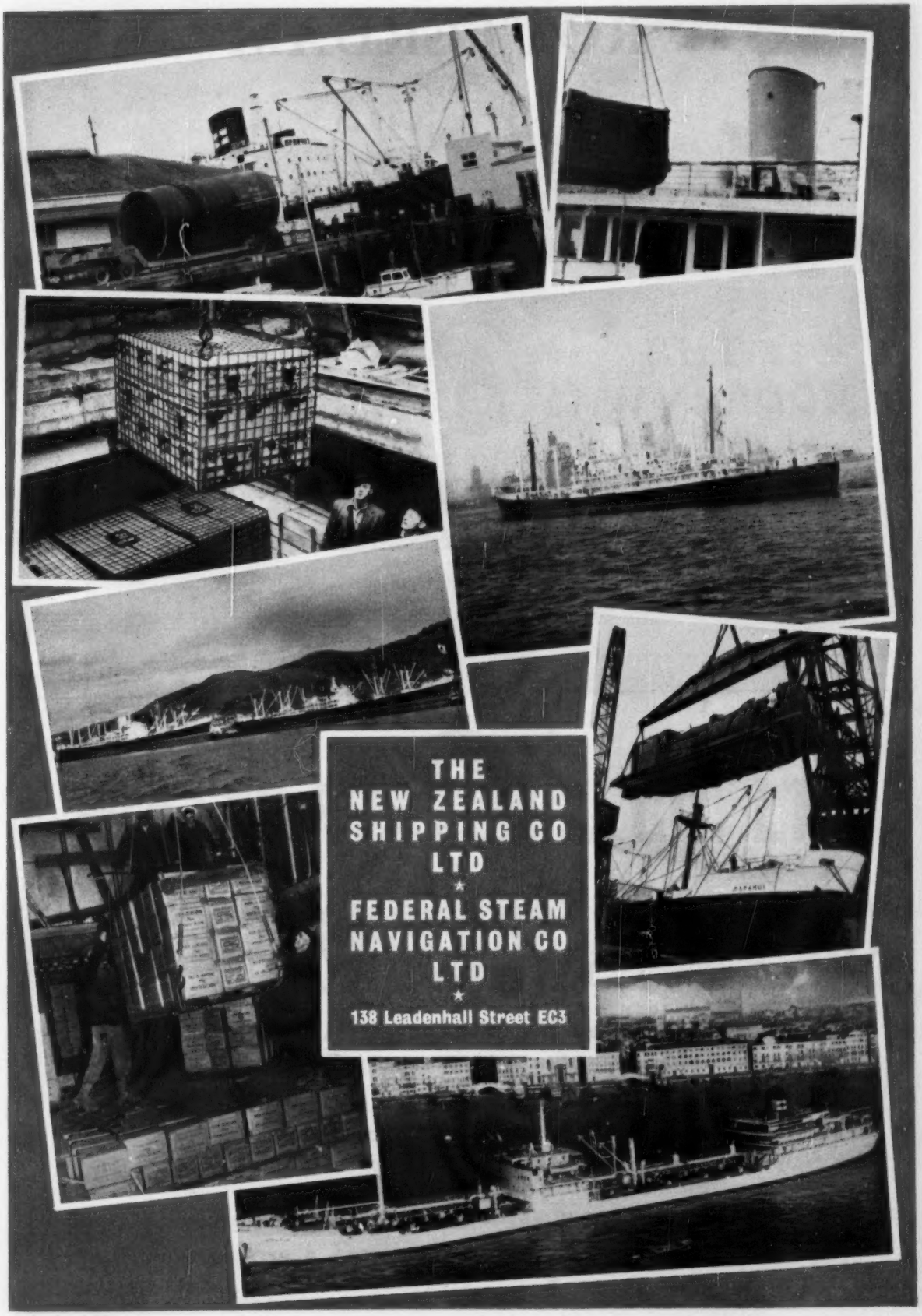
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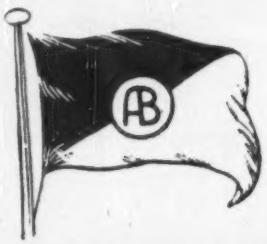


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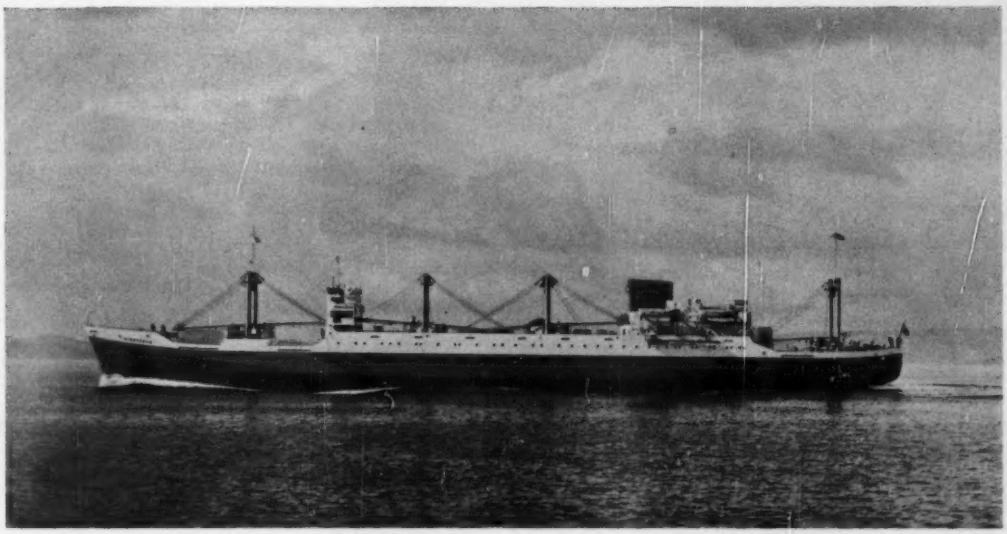
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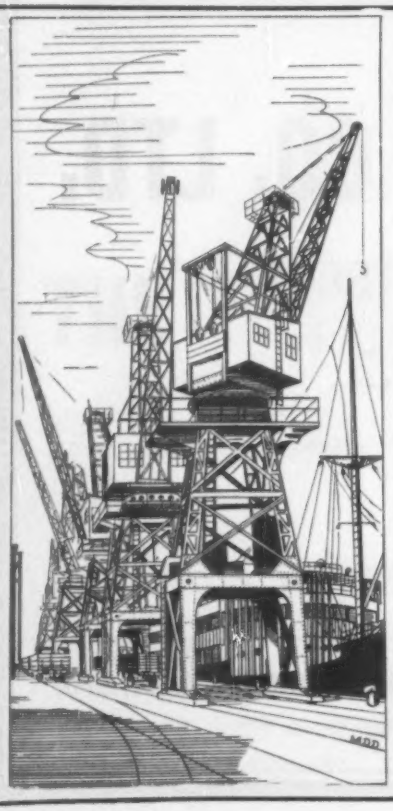
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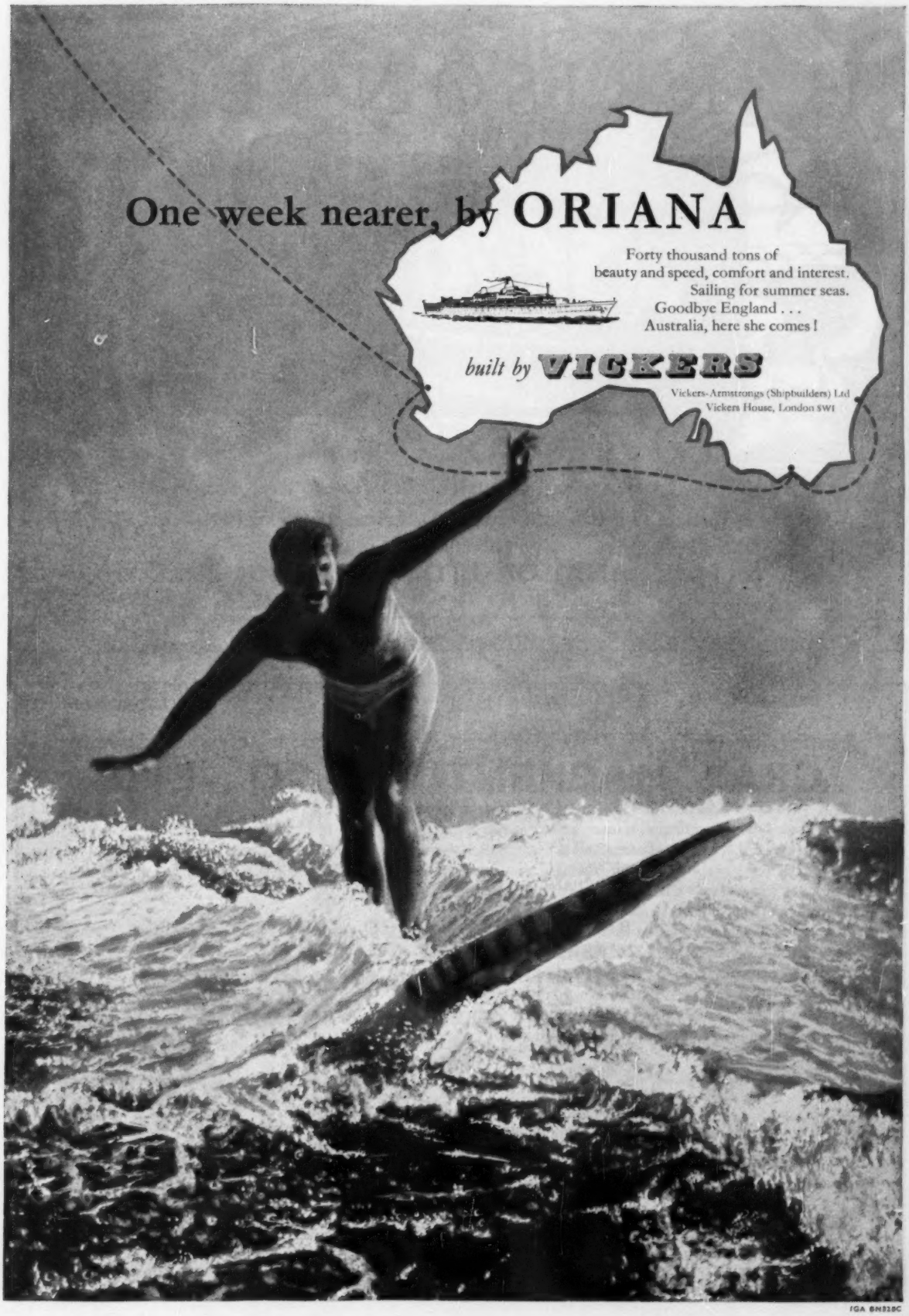
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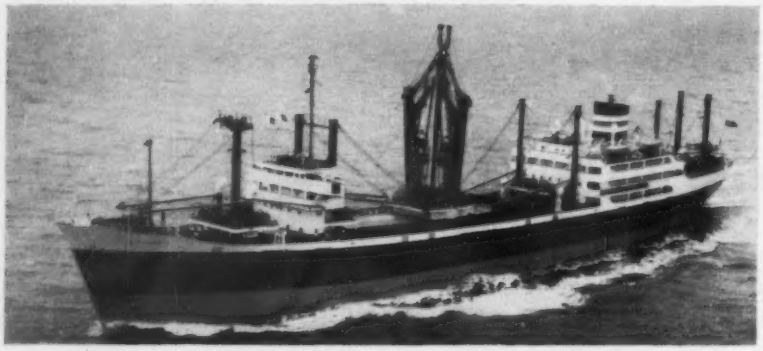
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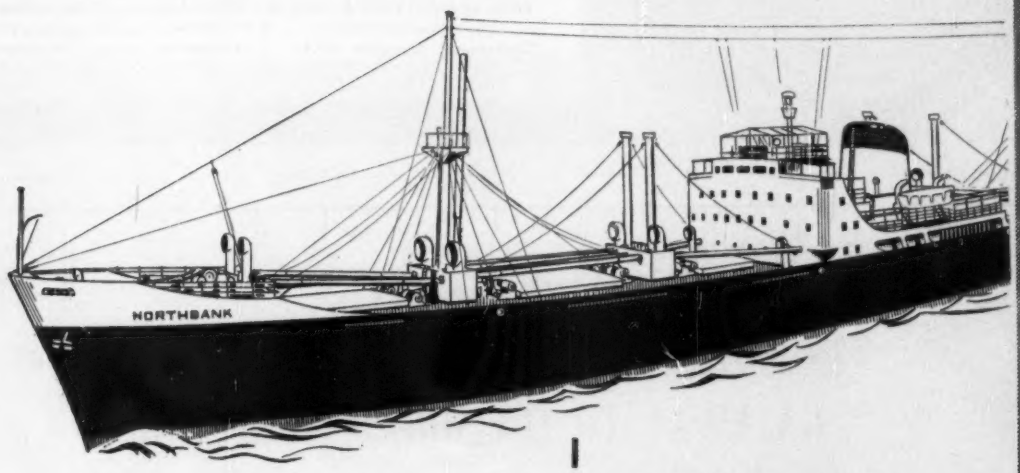
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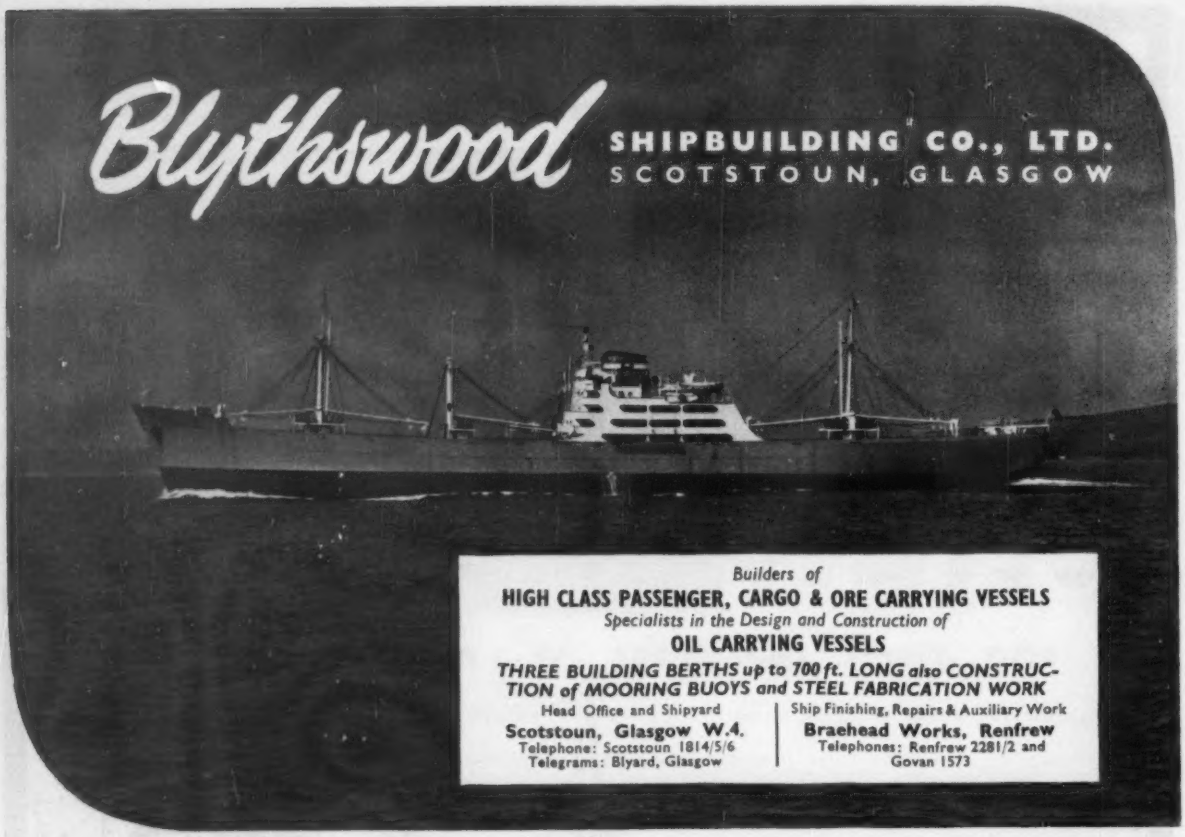
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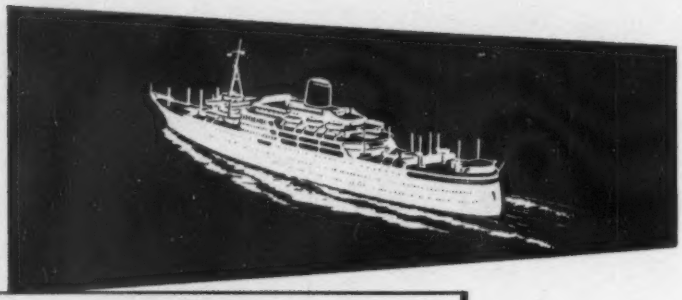
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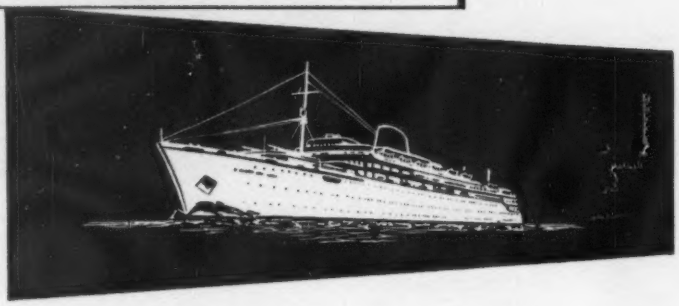
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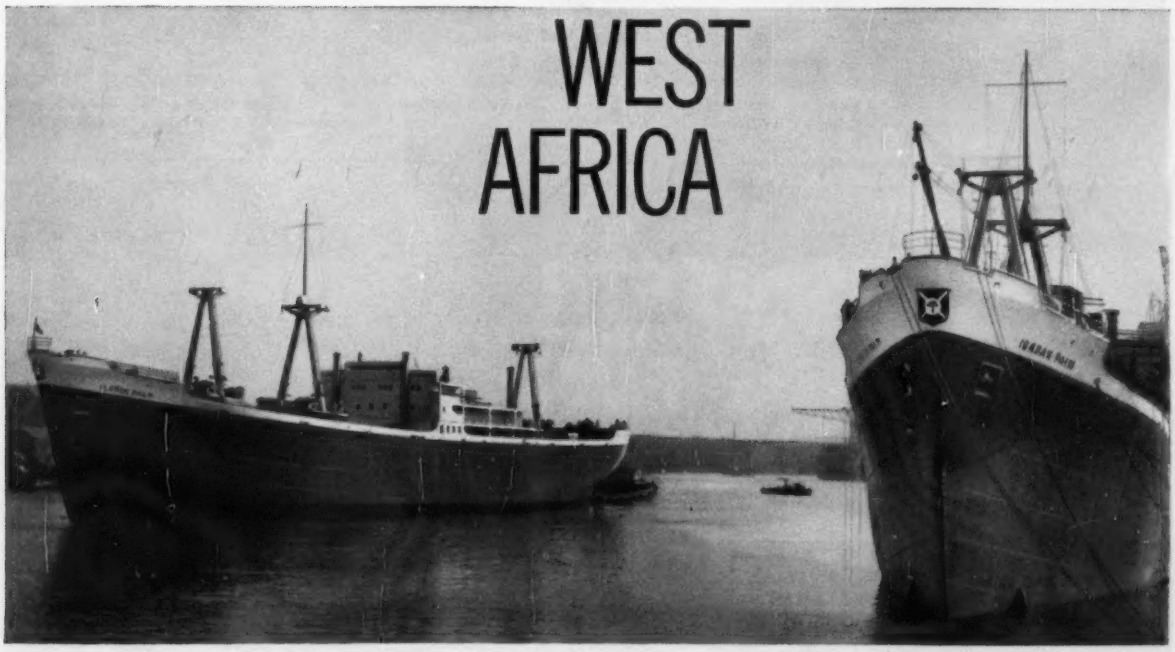


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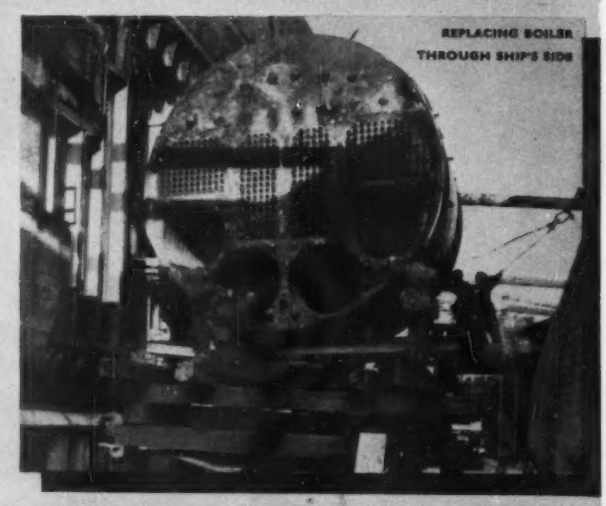
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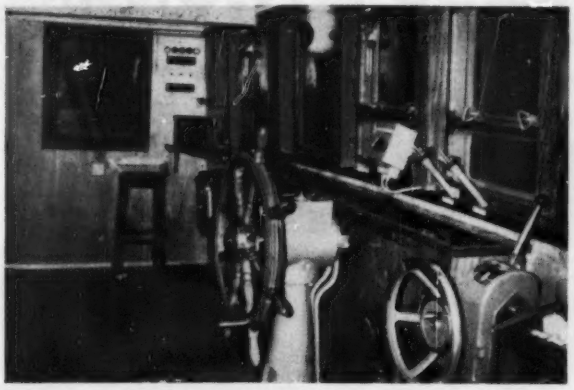
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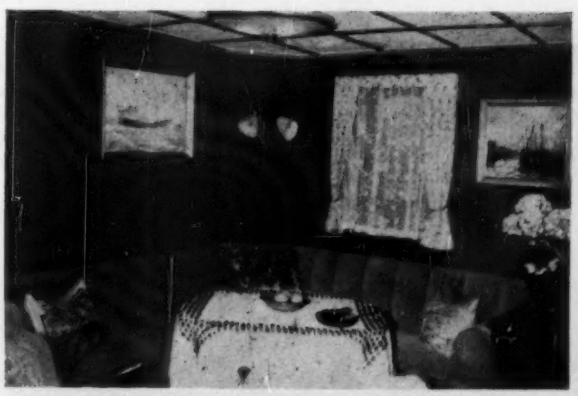
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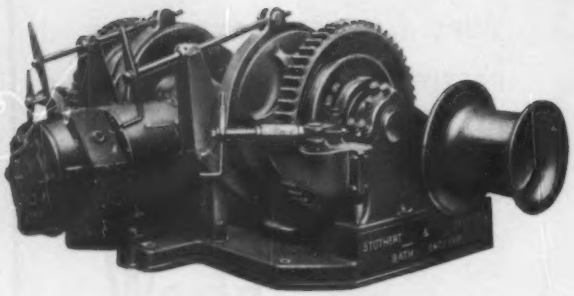
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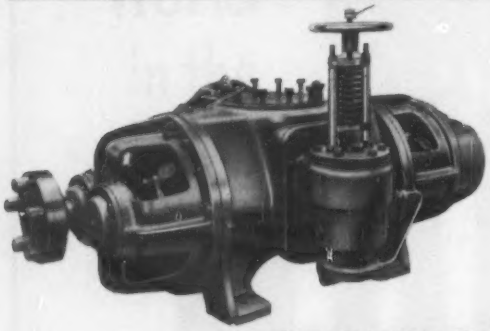
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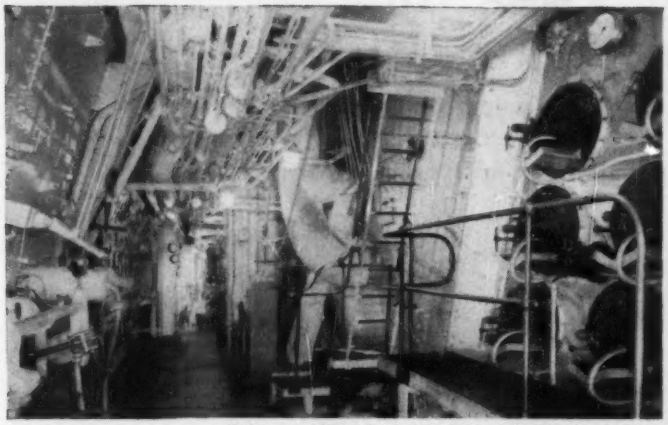
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BABCOCK SHIPPING NEWS



Boiler room of R.M.S. Windsor Castle; with Selectable-Superheat boilers, (right) and, on the left the Header-type auxiliary boiler.

STEAM FOR A THOUSAND SHIPS — A PROUD FIVE-YEAR RECORD

Over the past 5 years, Babcock marine boilers have been ordered for the *main propulsion* of nearly 1000 vessels, of up to 87,000 tons d.w., and for both merchant and naval service; while a growing number of ships, including motor vessels, is being equipped with Babcock water-tube boilers for *auxiliary-service*, e.g. supplying steam for hotel services, tank cleaning and manoeuvring in harbour.

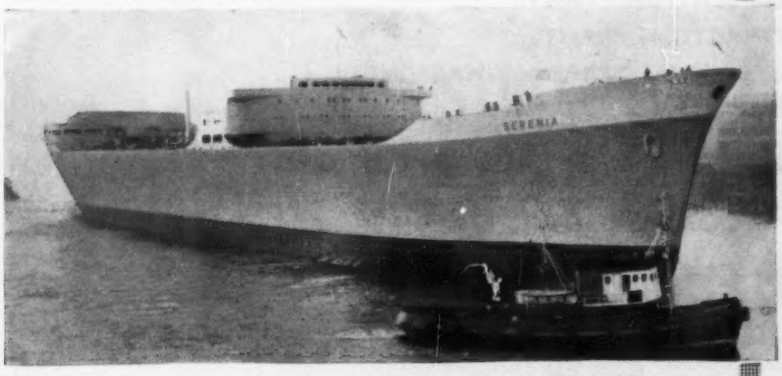
For this application the Babcock *Header-type boiler* offers proved, practical advantages of lightness, compactness, quick steaming and ease of maintenance.

Recent years have been notable for the wide use of the *Selectable-Superheat boiler* for many of the larger, faster vessels, including major passenger or passenger/cargo ships and a great number of tankers. An important trend has been the steam propulsion of an increasing number of Scandinavian tankers, with Babcock marine boilers–for example, Havkong, Nanny, Jaragua, Meline, Sea Song and others building.

Ships in the news, with Selectable-Superheat boilers are R.M.S. Windsor Castle, 38,000 tons gross, flagship of the Union Castle Line, (which also has a Header-type auxiliary boiler) and the recently launched Serenia (65,000 tons d.w.), the largest tanker built in Britain.

Many of these installations include complete Babcock equipment e.g. oil burners, pumping and heating plant, soot-blowers and automatic combustion and feed water controls.

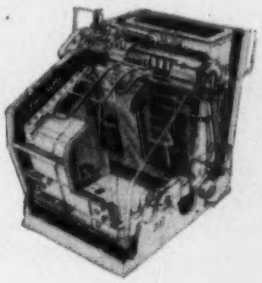
All are backed by *Babcock service* at major ports throughout the world.



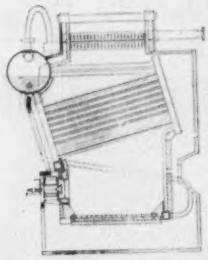
Largest tanker built in Britain—"Serenia" (Shell Tankers Ltd.) after launching from the Walker yard of Vickers-Armstrongs (Shipbuilders) Ltd. She will have two Selectable-Superheat boilers, for main propulsion.

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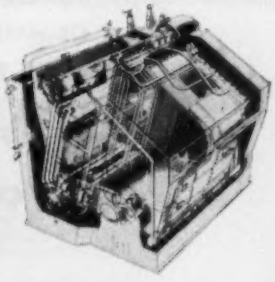
There is a well-proved Babcock boiler for every class of marine service, from the long-established Header-type boilers —ideal for medium and low-pressure installations, rugged, compact, easily maintained—to the modern high-performance bent-tube boilers such as the Integral-Furnace and Selectable-Superheat types, which have proved outstandingly successful for the larger, faster vessels.



Cut-away view of **INTEGRAL-FURNACE** *boiler.*



HEADER-TYPE, *single-pass boiler for auxiliary service.*



SELECTABLE-SUPERHEAT *boiler (Above) Cut-away view of Selectable-Superheat boiler—a compact single furnace unit providing simple, positive control of steam temperature by a system of differential dampers to adjust gas-flow through the "superheated" and "saturated" sections of the boiler. Well-proved in both naval and merchant service.*

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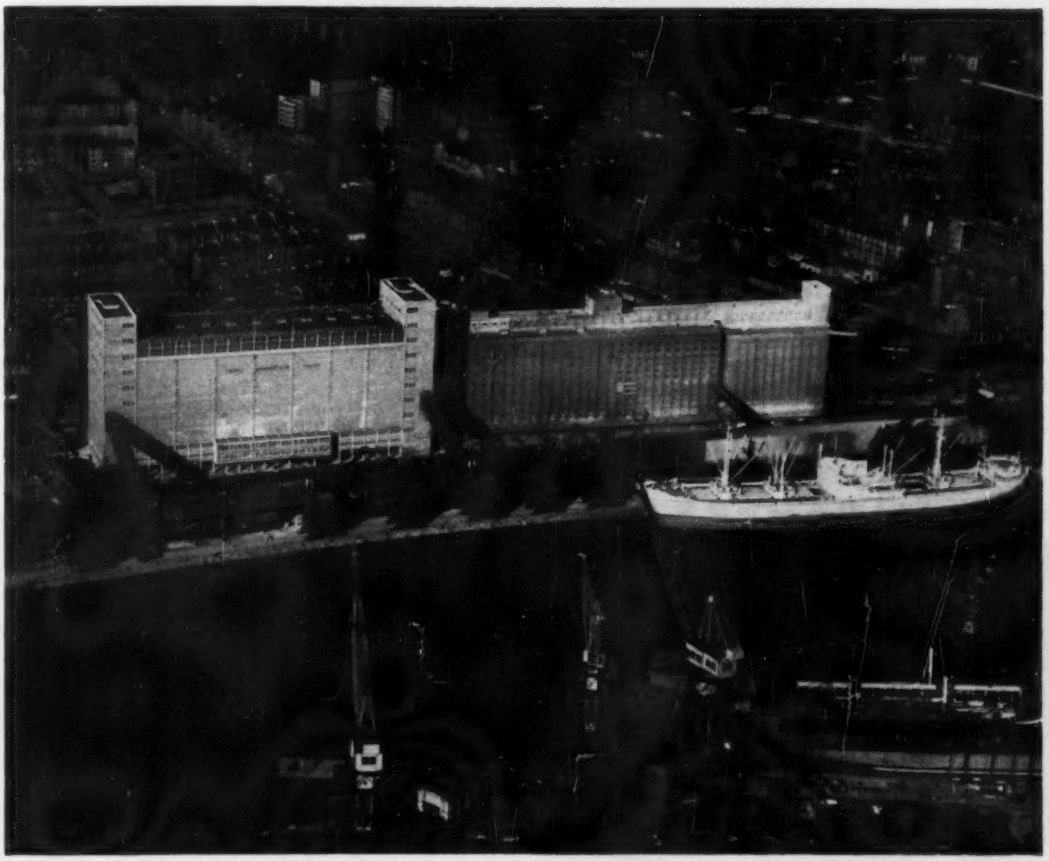
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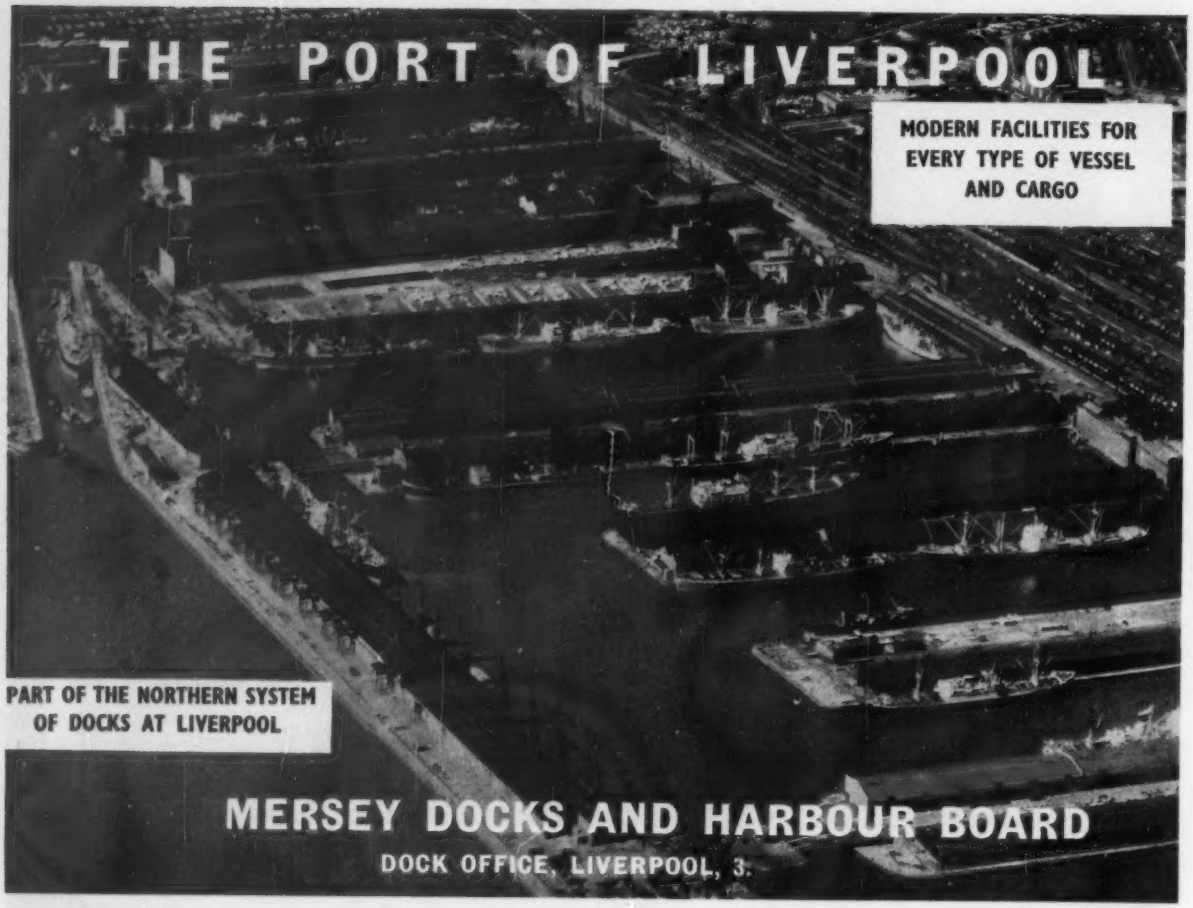
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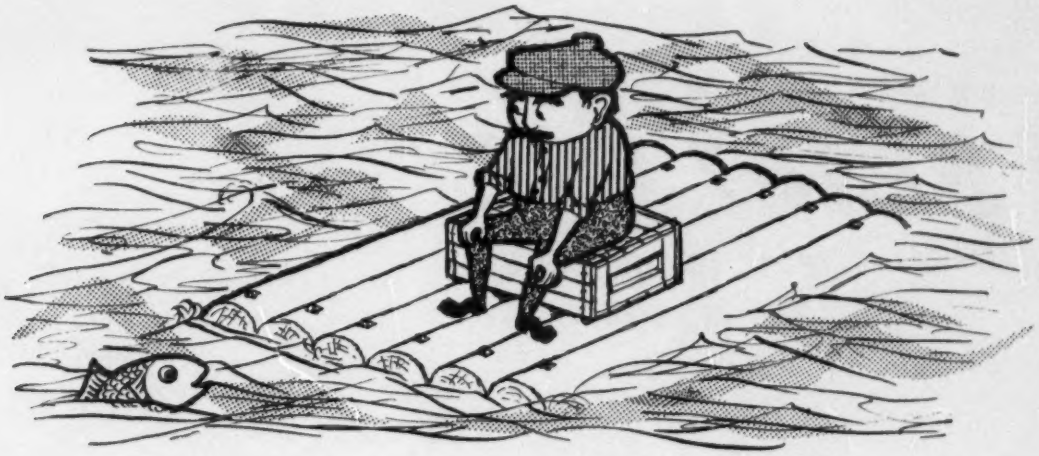
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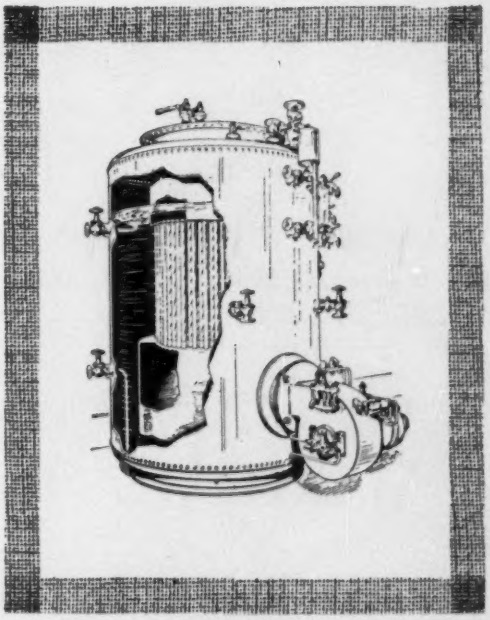


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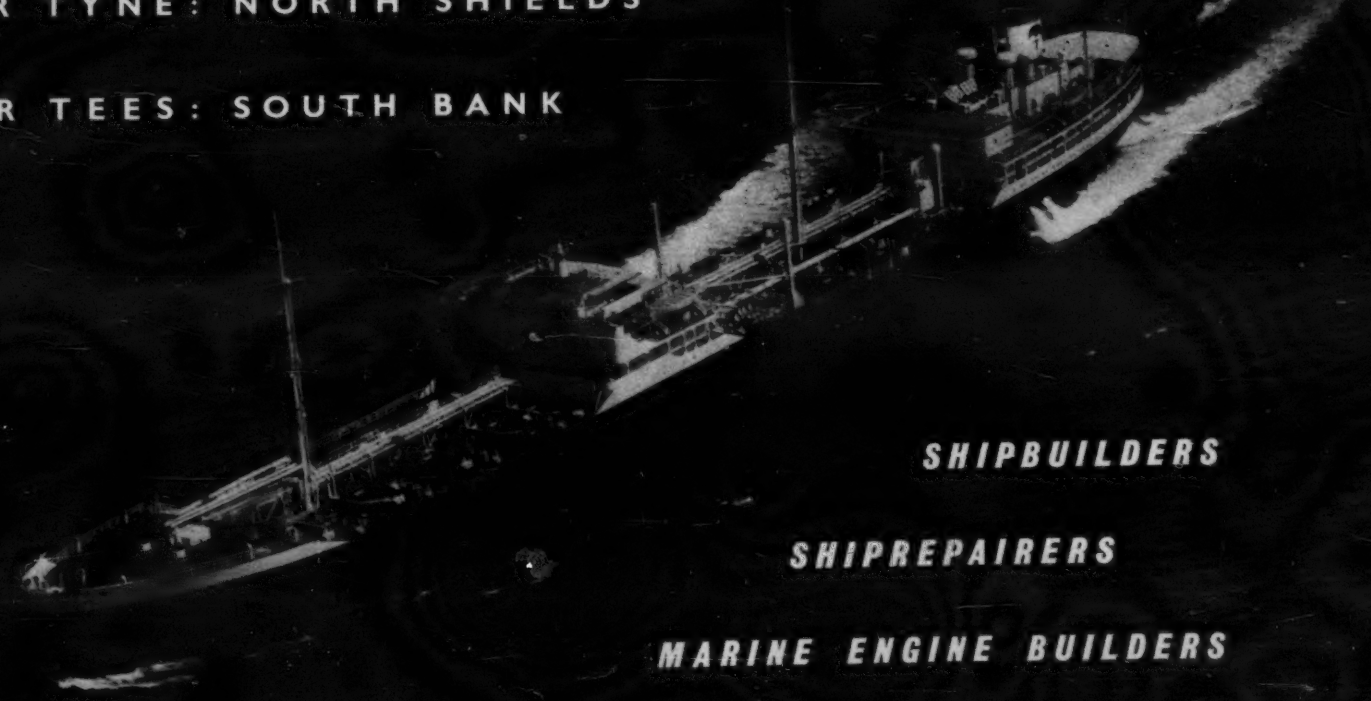
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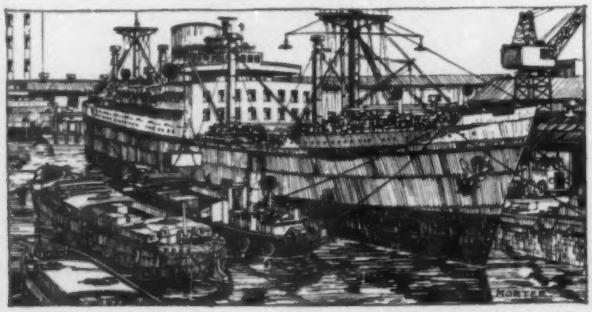
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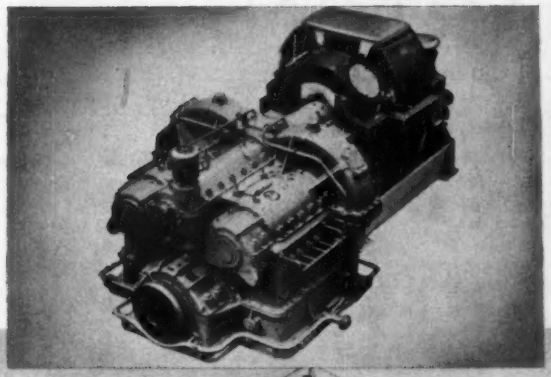
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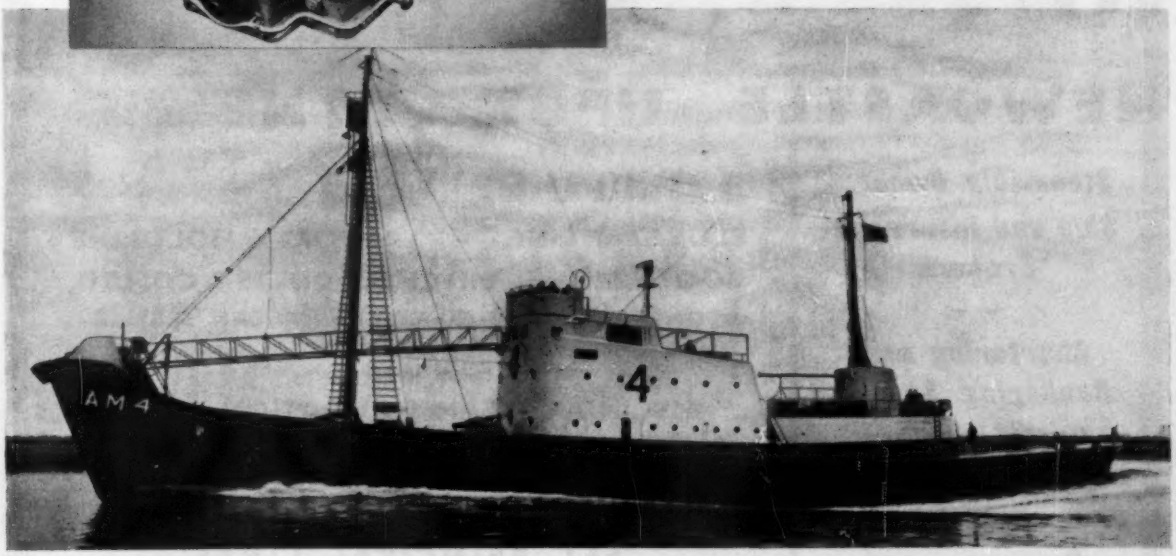


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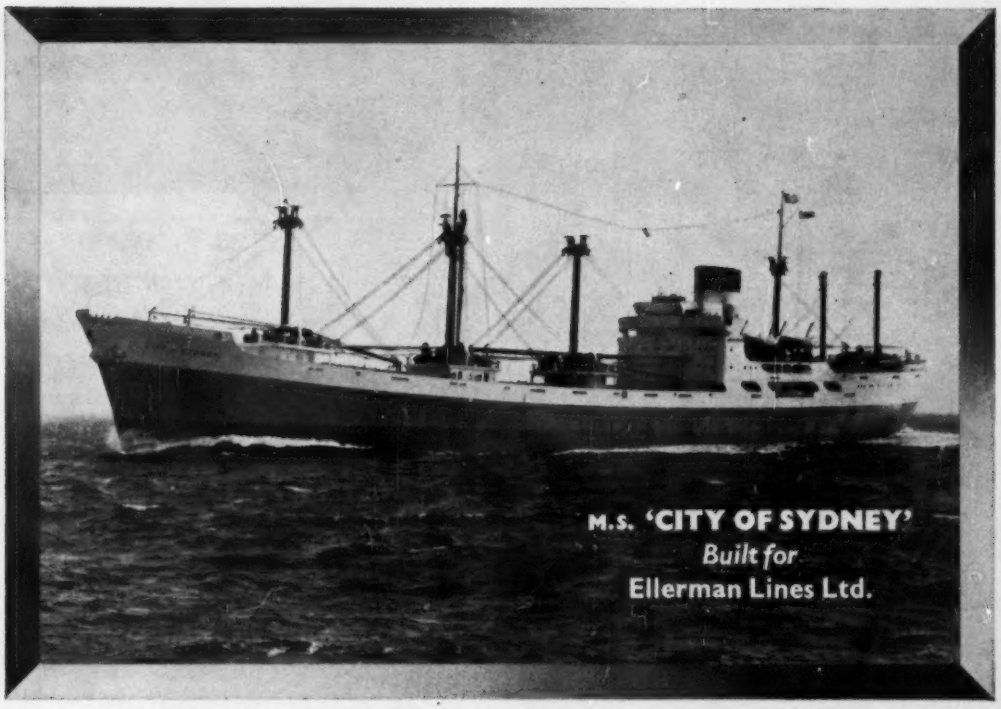
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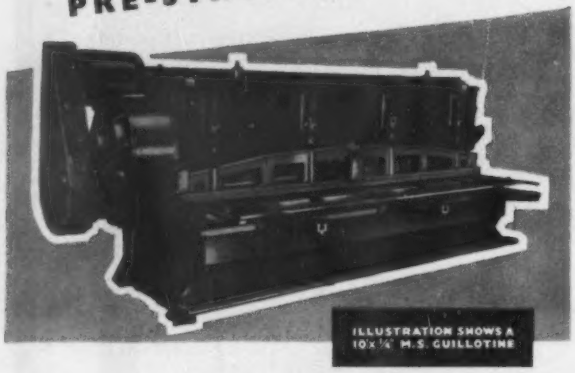
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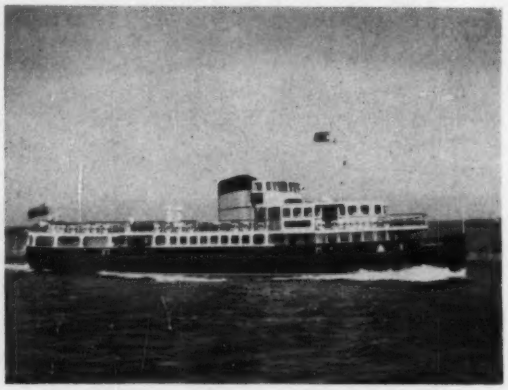
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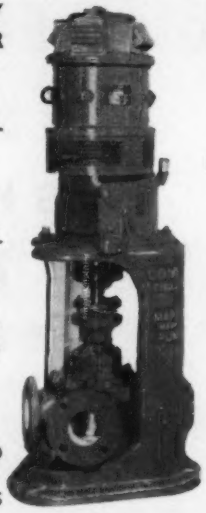
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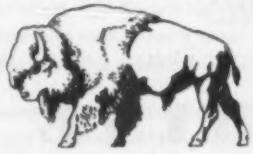
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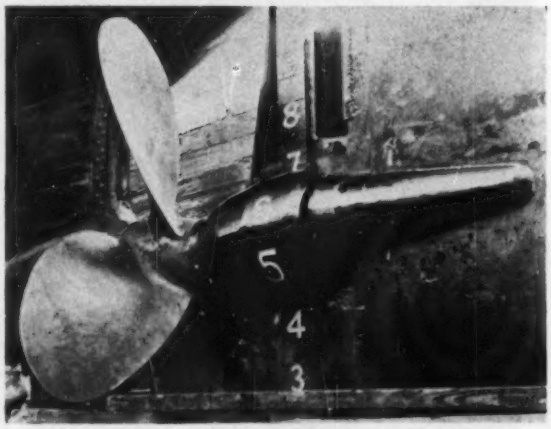
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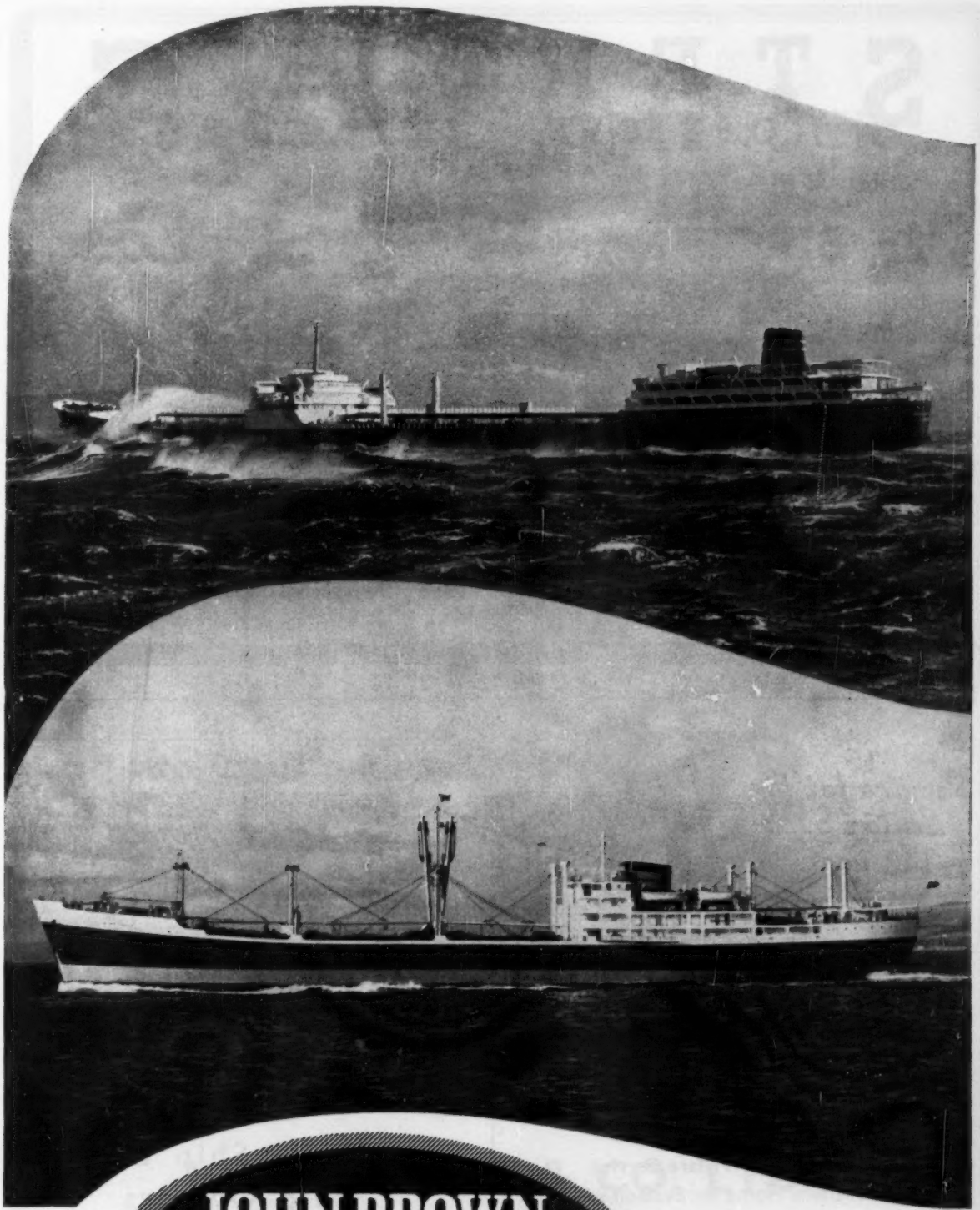
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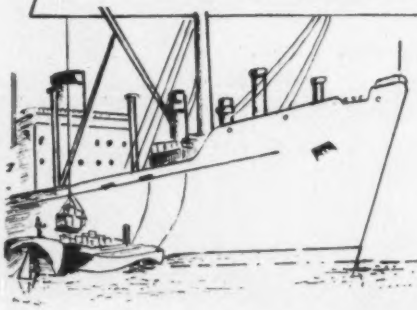
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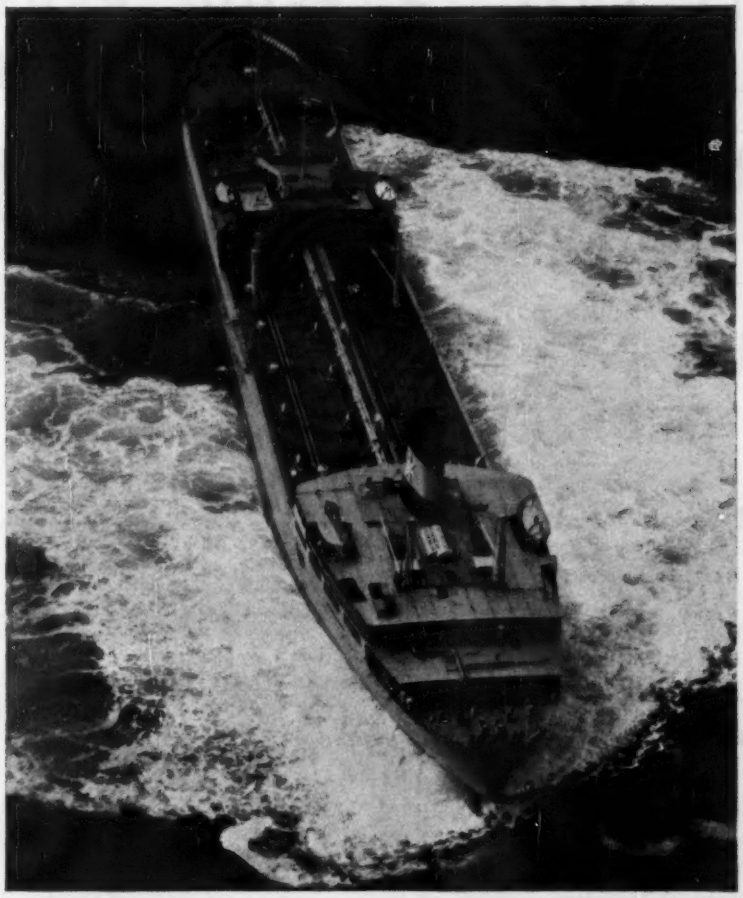
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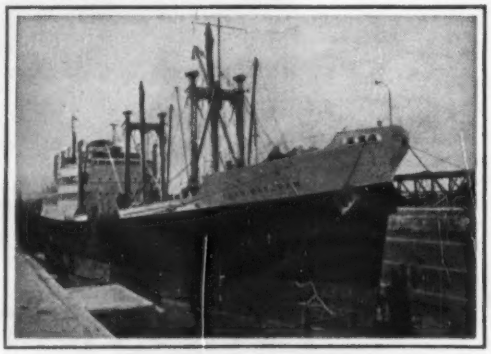
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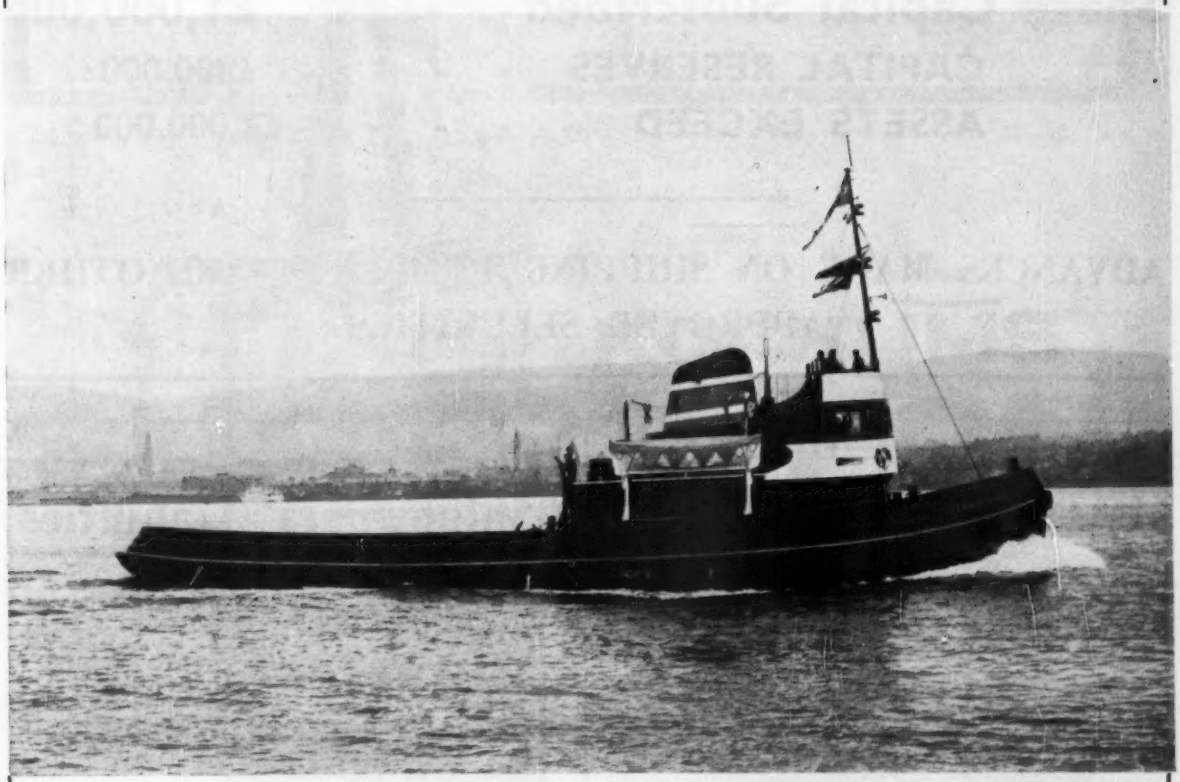


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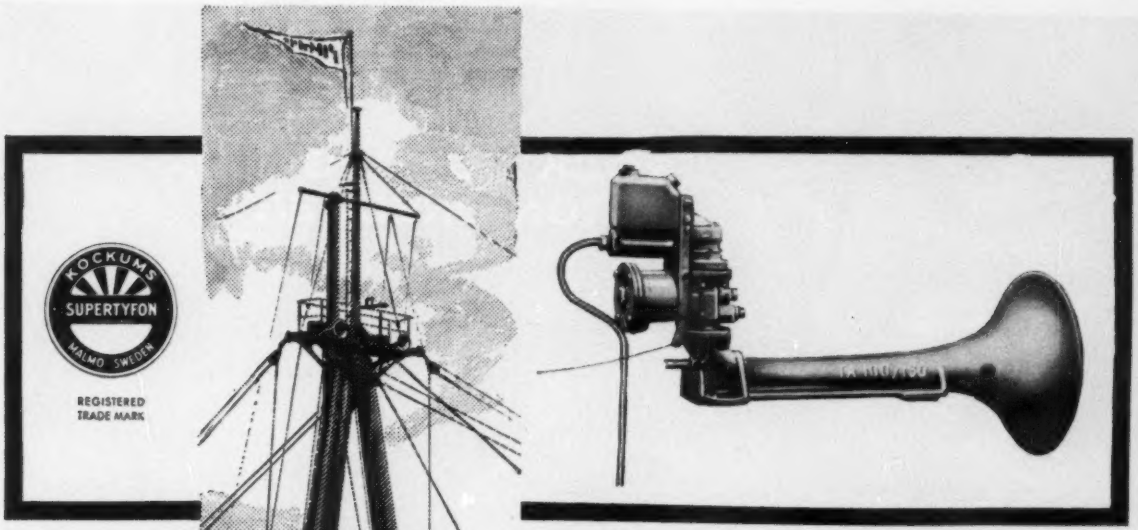
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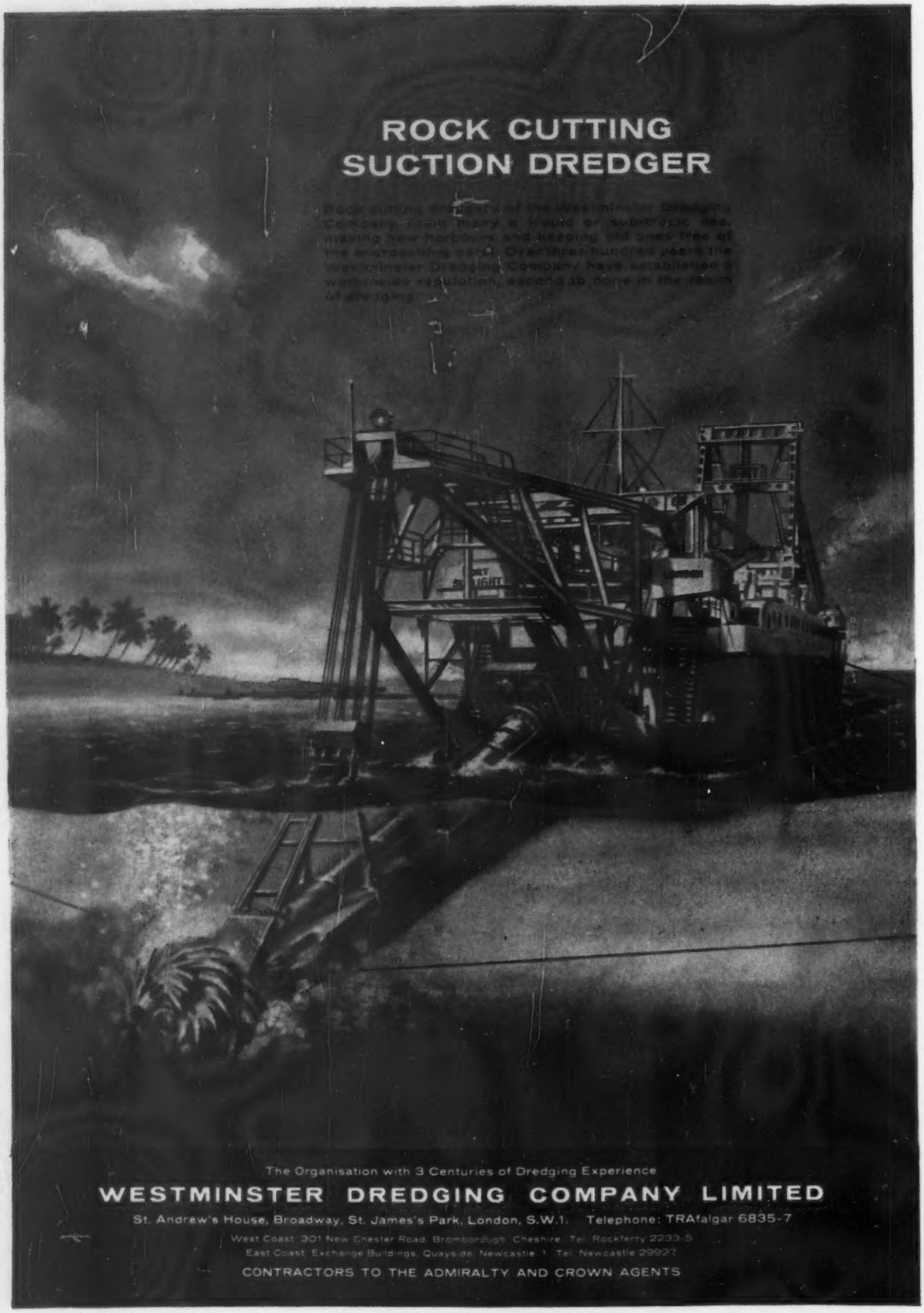
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Vol. 144 **11 JANUARY 1961** **No. 3518**

LEADER AND CURRENT EVENTS	17	THE NEW DOXFORD DIESEL ENGINE	50
MESSAGE FROM THE MINISTER OF TRANSPORT	20	OIL IN 1960	51
SHIPPING PROSPECTS FOR 1961	21	SHIP SALE AND PURCHASE MARKET	53
COST OF A CARGO SHIP	22	AIR TRANSPORT SECTION	57
BRITISH SHIPPING TODAY	23	SURVEY OF BRITISH SHIPPING	61
SHIPREPAIRING IN BRITAIN	25	HOULDER LINE LTD	64
REVERSING GAS TURBINES	26	SHIPPING AND SHIPBUILDING FINANCE	65
THE "CITY OF SYDNEY"	30	NOTABLE SHIPS OF THE YEAR	67
MACHINERY OF THE "ORIANA"	32	MERCHANT SHIPBUILDING RETURNS	98
MOLASSES BY TANKER	37	NEWS FROM OVERSEAS	101
BRITISH CONTAINER SHIP SERVICES	41	BRITISH SHIPS FROM BRITISH YARDS	104
FREIGHT MARKETS IN 1960	42	NEW CONTRACTS, LAUNCHES, TRIAL TRIPS	106
MARINE INSURANCE IN 1960	45	MARITIME NEWS IN BRIEF	107
MODERNISATION OF CLYDESIDE SHIPYARD	47	FIFTY YEARS AGO	108

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SHIPPING POLICY

THE long-awaited survey of the shipping industry has been published by the General Council of British Shipping (incidentally at a time which could scarcely be less convenient for the shipping Press). The document traces the decline in the relative size of the British Mercantile Marine and shows how its strength is being steadily sapped by the nationalistic policies of foreign governments through the adoption of flag discrimination, subsidies and the like, designed to create and maintain national merchant fleets regardless of economic considerations. The menace to the future wellbeing of British shipping has also been aggravated by the growth of tonnage flying flags of convenience, operating virtually tax-free. There is no simple answer to these and associated problems, but it is plain that action by foreign governments cannot be met by the industry alone. Hence the document embodies for the urgent consideration of Her Majesty's Government policy recommendations (summarised below) aimed at securing fair competitive conditions for British shipping, and the provision of the most economic and efficient sea transport services for world trade and commerce generally.

The problems of flag discrimination and the like have been fully ventilated over the last few years on many occasions. In this survey they are set out again, clearly, carefully, concisely and fairly. This is important for the consideration of people whose acquaintance with them is only distant. But what makes this document so valuable is that it sets up the guiding principles of a shipping policy for the British Government, and other governments, to pursue.

Sir Nicholas Cayzer, and the team of prominent shipowners comprising the General Council's policy committee, are to be congratulated on the work that they have put into the preparation of this historic document. The period of gestation has been about 18 months, and after so long a period of anticipation it is, perhaps, unfortunate it was eventually necessary to make an emergency call for the midwife (the Press) on delivery. The impact of such a document on a government, whether it be British or foreign, depends to a great extent on the publicity it receives from its interpretation by the Press, who deserve more than 24 hours' notice if they are to perform their function as efficiently as they would like.

Summary of Main Recommendations

Flag Discrimination

1. Every opportunity to reach an identity of interest with the United States of America in combating flag discrimination should be vigorously followed up, since United States policy largely holds the key to a solution.

2. If protests and persuasion fail to deter countries from practising discrimination, counter-measures offer the only other means of offsetting the damaging effects, and discouraging the spread, of discrimination as a feature of world trade.

3. Her Majesty's Government should therefore equip itself with such general powers as it needs for the effective application of counter-measures and should, as a matter of urgency, intensify and extend its studies of possible counter-measures and their application in individual cases. These studies would determine in which cases counter-measures could be effectively applied, and what specific action the Government should take.

4. Commercial treaties and trade agreements should embody the strongest possible anti-discrimination clauses.

5. The new Organisation for Economic Cooperation and Development should include a committee comparable with the Maritime Transport Committee of the Organisation for European Economic Cooperation. The members of O.E.C.D. (including the United States and Canada) should pledge themselves to a code of liberalisation for shipping such as that presently observed by member countries of O.E.E.C.

6. In the coordination of international economic policy shipping should be recognised as an essential element. It should be impressed upon aid-receiving countries that policies of flag discrimination are barriers to the promotion of international trade which the aid programmes are designed to foster. It should be a condition of loans under aid programmes that neither lending nor receiving countries will indulge in discriminatory shipping practices in the execution of the programme.

Subsidies

7. Every endeavour should be made by H.M. Government to persuade the United States of America to revert to her prewar practice of limiting the subsidisation of her shipping to the difference between domestic and foreign cost of ship construction and operation.

8. Subsidies, as a permanent form of general assistance to British shipping, do not offer a long-term solution of its problems, so long as it remains possible for shipping to be operated on a commercial basis. Whether British shipping will be able to continue thus to operate depends on the policies and actions of governments over the next few years. During this critical period, financial aid to the industry, in one form or another, may be necessary and may be the only way of giving the quick assistance needed.

9. Financial aid would be justified in the national interest where a particular British shipping service or a particular section of the industry is in danger of having

to be abandoned or substantially reduced in strength, due to competition of a kind which can no longer be met effectively by efficient commercial operation.

10. The Government having decided that aid to the Cunard Steam-Ship Company Ltd, in relation to the maintenance of an express passenger service on the North Atlantic, is desirable in the national interest, it follows that the Government should be ready to consider other cases where equally cogent reasons can be shown for Government help.

11. Other examples of circumstances which may make it necessary for the Government to consider financial aid to a particular service or section of British shipping are (a) the growing competition facing the passenger lines from air transport artificially maintained by subsidies in one form or another; (b) the effect on the coasting trade of competition from the railways facilitated by substantial Government financial assistance to the British Transport Commission.

12. There is much the Government can do to reduce the disparity between shipping and air transport so far as public expenditure on research and development is concerned.

Flags of Convenience

13. To counter the effects on British shipping of competition from flag-of-convenience fleets, there should be—

(a) additional United Kingdom taxation relief for the industry; and

(b) freedom for United Kingdom shipowners to take full advantage of low taxation elsewhere in the Commonwealth.

Given these alternatives, it would be for the British shipowner to decide, according to his particular circumstances, which of them would best strengthen his competitive position.

Taxation

14. The investment allowance for shipping should be increased and stabilised to aid forward planning in the industry; the maintenance of the investment allowance at a fixed rate should be an essential long-term feature of taxation as applied to shipping.

15. There should also be a more positive approach by the Government to the removal of obstacles which taxation puts in the way of the maintenance and development of the United Kingdom merchant fleet.

Coasting Trade

16. There should be a review of the internal transport system of the country. The consideration of machinery for the agreement and observance of rates between road hauliers should be an essential element of such a review.

17. As a short-term measure, the provisions under existing legislation for the protection of coastwise shipping in relation to railway competition should be strengthened and the Minister of Transport should give directions to the British Transport Commission designed to avoid further losses of traffic from sea to rail through uneconomic rate adjustments.

Whaling

18. Support from H.M. Government, possibly through some form of subsidy, may soon be necessary if United Kingdom whaling is not to be totally abandoned.

Departmental Administration

19. Every assistance should be given by the Ministry of Transport in overcoming the problem of recruitment and training of Engineer Officers for the Merchant Navy.

20. In the conditions of today, departmental responsibility for shipping—which derives historically from safety regulatory functions—should be so adjusted that the main purpose and functions of the Department are to foster the prosperity of British shipping as an industry of national importance and to ensure that it has every opportunity of earning the maximum from its function of world carriage. It necessarily follows that the shipping industry must give the Department the utmost support in its work in this vital field.

Current Events

Departmental Administration

THE report of the General Council of British Shipping on shipping policy gives a prominent place to the matter of departmental administration. It raises the question as to whether, in the circumstances, the present allocation of departmental responsibility for shipping (the Ministry of Transport) is the most appropriate, at least for foreign-going shipping. Being essentially the servant of international trade, and to an increasing extent vulnerable to the actions and policies of foreign governments, British foreign-going shipping has problems very different from those of other and internal forms of transport; and there can be no doubt that most of the Ministry of Transport's time and attention must be devoted to the problems of the roads, railways and inland waterways. This is not to say that the shipping industry does not appreciate and applaud the efficient way in which the section of the Ministry which derives from the former Mercantile Marine Department of the Board of Trade carries out its regulatory functions in such matters as the safety of life at sea. But is it right that this should be the principal preoccupation of the Government department charged with responsibility for shipping, and recently merchant shipbuilding too? Many of the difficulties and problems which the shipping industry faces today can only be dealt with by government action, mostly at diplomatic level. The General Council does not go on to recommend that any specific department should be charged with this responsibility, but it is fairly obvious that if a separate Ministry of Shipping is not to be set up, with high Cabinet rank, then shipping should once again return to the wing of the Board of Trade.

Shipping and Research

THE General Council naturally refers, in its survey of the shipping industry, to the competition which it is meeting from air transport, and points out once more the substantial aid which this growing industry receives, directly or indirectly, from the Government. Government financial backing enables aviation research and development to be undertaken on a scale which commercial concerns could not contemplate, and there is much the Government could do to reduce the disparity between the two forms of transport in this respect. British shipping receives no advantages comparable with the large sums of public money spent on aircraft research and aids to navigation, and the maintenance of airport facilities. On the contrary, shipping pays the full cost of the port facilities and the navigational aids it uses. Government expenditure on the development of nuclear propulsion for merchant ships is negligible compared to what is being spent on aircraft research; and the General Council quite rightly maintains that if the Government considers it right and proper to spend money in this way, then it is equally right and proper that public funds should be spent on marine research and development. There is no

lack of public money in the United States for this purpose, and it is by no means the only country in which the government considers it part of its duty to assist and encourage the national industries in this way. Times are changing, and policy must change with them if Britain is to continue as a leading maritime nation. The British shipping industry has made out a logical case for a fresh approach in this field, and indeed it is not the first time that this has been done. It is now up to the Government to act.

Order for Bristol Siddeley Maybach Engines

IT WAS only recently that a comment was made in this journal on the increasing number of large and medium size marine diesel engines being built under foreign licence in Great Britain. It has now been announced that the first order has been received for Bristol Siddeley Maybach high-speed diesel engines for marine propulsion. The order comprises twelve type MD 225 engines, each of 394 bhp, for installation in six new trawlers to be built by T. Mitchison Ltd, Gateshead, to the design of Burness Corlett & Partners Ltd, London. The trawlers, which will be operated by the Pelagic Trawling Co Ltd, North Shields, are single-screw vessels of hydroconic form. In each trawler a controllable-pitch propeller will be driven by two engines through an MWD single reduction gearbox. The MD range of engines is manufactured in England by Bristol Siddeley, under licence from Maybach Motorenbau GmbH, Friedrichshafen. The MD range was described in THE SHIPPING WORLD of 8 April 1959. They are all of the high-speed type running up to 1,600 rpm, and having as a special feature a "tunnel" type crankcase. These will be the first British trawlers to be fitted with Bristol Siddeley Maybach engines although the type has already proved itself in many German marine applications. In addition to being suitable for propulsion, these engines, which range in power from 300 to 3,600 bhp, are equally suitable for auxiliary purposes.

Halmatic Joins Hunting Group

HALMATIC LTD, probably the world's leading company in the manufacture of fibreglass boat hulls, has joined the Hunting Group. It recently exported a 67ft hull, the biggest one-piece reinforced plastic moulding ever made, to the United States. The company intends to increase its production of standard hulls and to continue its research and development programme. A new factory near Leicester has been opened to supplement the Portsmouth works. Greater support will be given to that section of the trade which is interested in the marketing and fitting out of hulls. Apart from items already supplied integral with the hull, such as tanks, decks, coach roofs and centreboard casings, associated companies are to fabricate metal parts which boatbuilders normally put out to subcontract. These include keels, stern gear, pulpits and stanchions. With the engineering background of the Hunting Group, particularly in aviation and shipping, the company is now ready to make its resources available to industry in general.

The Ship that Sank

JUST before the Christmas holiday, the reserved judgment of Mr Justice Pearson in the Queen's Bench Division (Commercial Court) was announced in the case of the *Tropaioforos* (*Compania Naviera Santi S.A.* v *Indemnity Marine Assurance Co Ltd*). This reserved judgment has been awaited with considerable interest in view of the nature of the evidence before the Court and the manner in which the discharge of the burden of proof resting on each of the parties was presented in the pleadings. As in a number of cases which have inevitably been associated with a loss of a vessel in this way, much of the evidence is circumstantial. In his judgment, Mr Justice Pearson said that the plaintiffs had the burden of proving that the loss was accidental, although the degree of proof required in law was only to show a balance of probabilities in favour of an accidental loss by perils of the sea. Due consideration must also be given to the fact that scuttling a ship amounted to fraudulent and criminal behaviour. The judgment, therefore, reviews the available evidence against the background of any suggested inducement which the persons concerned might have to relieve themselves of a ship which may well have become an uneconomic business proposition, and possibly a liability, at the time of the sinking. In his view, his Lordship did not consider as serious possibilities any of the three suggested submerged objects which the vessel was alleged to have struck. On the other hand, the theories put forward on behalf of the underwriters, while they contained numerous uncertainties, did provide the only explanation of the large rush of water into the engineroom which caused the vessel to sink. It was therefore held that the plaintiffs had failed to establish any balance of probabilities in favour of their contention that the loss was accidental and by a peril of the seas, and his Lordship reached the more definite conclusion that the ship was scuttled. Earlier in the judgment Mr Justice Pearson found that there was a motive for scuttling the vessel and, if the vessel was scuttled, the owner must have connived at and procured it. Judgment was given for the underwriters, with costs.

Amsterdam Ambitions

WITH the beginning of work on the enlargement of the sea entrance at Ymuiden, the port of Amsterdam may well look forward to a further development in its trade. The project has been foreshadowed for some time but it has involved considerable preparatory work and hydrographic study. New piers are to be built at the entrance and the navigable passage will be widened to nearly 1,000ft at the bottom. The aim is to make Ymuiden, and Amsterdam beyond, accessible to ships of 40ft draught, and particularly the larger bulk carriers coming into service. For it is on the handling of bulk commodities that a good deal of the postwar development of Amsterdam has depended. The lock at the entrance to the North Sea Canal at Ymuiden is over 1,300ft long and it has a depth on sill of 49ft, while the 13-miles long canal has a dredged depth of 41ft. Any increase in ship and cargo tonnage will involve increasing the facilities in the port itself and, as Mr H. van Lennep pointed out the other day at the annual dinner of the Amsterdam Harbour Guild, increasing the capacity of the transit facilities inland. Commercial interests of the City will therefore continue to press the Government to increase the capacity of the Amsterdam/Rhine Canal by widening some parts, enlarging the locks and heightening some bridges. On the same occasion Mr van Lennep announced that the number of ships visiting the port last year had gone up by 250 to 7,500; there was a similar increase in the previous year. In the port area the plan is to turn a further 3,750 acres of land into basins, wharfage, storing grounds and industrial sites. And there is talk of building virtually a new harbour for vessels up to 70,000 dwt, which it is claimed—perhaps with more ambition than judgment—might be completed in 1965. The prospects of trade growth inherent in the development of the European Common Market have been in the forefront of all planning within the major ports of the Near Continent for some years. Among these ports Amsterdam occupies fifth place, but it will have some way to go before displacing Bremen as its nearest rival. It would be unfortunate if rivalry led to over-reaching and wasteful expansion, but there is no sign that such a stage has yet been reached.

Annual Survey of the Maritime Industries



A Message from the Minister of Transport

Rt. Hon. ERNEST MARPLES, M.P.

THE YEAR 1960 is not likely to be looked back upon with any great enthusiasm by anyone in shipping. But there have been bright spots—notably the fourth International Conference on Safety of Life at Sea, which was held in London. We in the United Kingdom have always played a leading part in these important Conferences and I think all concerned with the shipping industry must record their gratitude to the Intergovernmental Maritime Consultative Organisation, who organised the Conference, and to the many others who in their various ways helped the work to its successful conclusions. Let us hope that in other fields of shipping activity the same spirit of cooperation and mutual understanding will prevail. Let us hope also that the vision, skill and faith on the part of British shipowners which the *Windsor Castle*, *Oriana* and *Serenia*, among others, represent will be well justified. The Government, for its part, will do all within its power to help.

What then of the shipbuilding industry? Firstly, let us recognise that while the long period of prosperity the industry has enjoyed is over, we are not facing a repetition of the 1930s, when for years few of our yards had any work at all and much of the rest of our heavy industry was similarly placed. Now, the prospect is by no means so bleak and fortunately most other industries are thriving. There is, however, a risk that men will drift away from shipbuilding and perhaps be reluctant to come back when times get better.

Secondly, 1960 has seen a lot of criticism of the shipbuilding industry. Some of this has come from outside; but lately voices have been heard from within its ranks which show that a re-appraisal is going on. And it is very encouraging that both sides of the industry have been regularly sitting round a table in my Ministry to discuss the future together. This is a much better way for an industry to tackle its problems that the old-fashioned one of letting things drift until there is difficulty and then shouting about it in public. We seem to lose no opportunity of letting the world know when all is not well with the way we run our affairs. This is, of course, news. What we need to remember is that if this is all the world hears, the picture we present is a very distorted one. Can we afford this luxury? What I suggest should guide us in shipbuilding in 1961 is the need to listen to well-founded criticism and consider what should be done about it. If this happens, we need not fear the future.

Shipping Prospects for 1961

FEW SIGNS OF IMPROVEMENT

By Hugh Hogarth



President of the Chamber of Shipping of the United Kingdom

FEW SHIPOWNERS can regret that the old year has ended, for it was another bad year for the world shipping industry as a whole. In 1960, all the familiar symptoms of recession were in evidence. As in the two preceding years large numbers of ships were laid up throughout the world; freight rates were at all times at inadequate levels; costs of operation generally tended to go on rising; and the other, even more sinister, major causes of British shipping's troubles, namely those arising out of governmental aid granted to foreign shipping, were more active than ever before. Now, at the start of a new year, the portents appear to be little, if at all, better.

No Substantial Relief

That 1960 brought no substantial or sustained relief from the effects of depression has occasioned little surprise within the industry itself. At the beginning of the year it was not expected that a sufficiently close relationship between supply and demand, a pre-requisite for a return to the wellbeing of shipping, would be achieved before the year ended, either as a result of an increase in international seaborne trade, a rate of scrapping in excess of the rate of new construction, or a combination of both.

At best, it was thought that the trading position might improve basically, without however materially affecting rates; and in the event this did happen. There was a marked decline in the amount of shipping laid up for want of employment and there was also a little more stability in rates of freight with even a few moderate advances here and there. The figures issued by the Chamber of Shipping show that, whereas at the beginning of the year there were no fewer than 855 ships in idleness, these aggregating some 6.3 million gross tons—that is to say, something like 6 per cent of the world merchant fleet total—by December their number had declined to 473, totalling about 3.6 mn tons, or 3 per cent of the world total. This represented a reduction over the year of 382 ships and some 2.7 mn tons.

In comparing the situation today and twelve months ago it would, of course, be wrong to discount such developments as those I have just mentioned. At the same time, however, it would also be a mistake to attach too much importance to their immediate value. After all, as the tramp freight rate index shows, shipping is selling its services today at something like a quarter less than it could charge in 1952, the index figure last year having never once moved out of the 70s.

Fleet Replacement

British shipowners have many worries with which to contend and one of them is fleet replacement. The orderly introduction of new equipment to replace or even augment the old is necessary in every industry, but particularly in shipping which operates in an international and therefore fiercely competitive market with ships which have a useful life of a mere 20 years or so. When the industry has to sell its services at or below cost, as it has often had to do in the last three years, it has little opportunity of accumulating capital out of current earnings to pay for new ships.

I do not want to paint too gloomy a picture of British shipping's future prospects, but I do want to ensure that the dangers that lie ahead are not minimised. It is common knowledge that shipping as a whole suffers in isolation while the rest of industry, by and large, is enjoying " boom " conditions; but I wonder how many have given thought to the possibilities that would arise were world commerce to suffer an unforeseen recession? Again, if healthier conditions do return to shipping sooner than we at present expect, will British shipping still carry a handicap compared with an increasing number of its most formidable competitors? Thoughts such as these cannot be ignored, and they are questions which demand an answer.

Striking Changes

British shipping has maintained its pre-eminent position in the face of growing competition with a certain amount of success, but it has been no easy task. All round us, ever since the end of the war, we have seen striking changes take place in the world political and economic scenes. New nations have emerged and have ventured into shipowning and shipbuilding, either for reasons of prestige or as a mark of economic independence. On the other hand, other countries have embarked on ambitious schemes of social advancement which will affect the flow of raw materials and trade and therefore shipping services. Some of the traditional shipping trades have disappeared and others have taken their place. Such changes as these, and many others besides, cannot but have their impact on our industry; and the great challenge of our times lies in knowing how to adjust shipping services to meet them.

I do not suggest that the British shipowner's judgment is infallible, or that he knows by instinct the answer to every difficulty that arises. I think it fair to say, however, that he has applied himself at all times to his task with determination and skill and has learnt to adapt practice to circumstances.

British shipping was build up in the days when the freedom of the seas had become the established order following the repeal of the Navigation Laws. Now

the freedom of the seas is increasingly threatened by flag discriminatory and other similar practices and these present a grave danger to our future prosperity as a nation.

If a backward glance in shipping is not inspiring, then a forward look is hardly more reassuring. The more we study our difficulties, the more it becomes clear that there is no simple solution. Our hope is that the Government will honour its pledge to give the industry all the support it can properly give.

British shipowners will, for their part, continue to do all in their power to maintain the British merchant fleet in the pre-eminent position it still occupies, even after years of adversity.

Cost of a Cargo Ship

APPROXIMATE COST OF BUILDING A MOTORSHIP

TO PROVIDE some indication of the current level of shipbuilding costs in the United Kingdom, THE SHIPPING WORLD has prepared the accompanying analysis of the cost of building a modern open shelterdeck cargo motorship of about 10,000 dwt.

It must be stressed, however, that THE SHIPPING WORLD analysis of shipbuilding costs can only act as a barometer to prices in the industry as a whole, since actual costs will depend on the varying practice of each shipyard and engine shop, as well as on the individual requirements of shipowners in their designs and specifications.

The vessel considered is a single-screw open shelterdecker motorship of some 10,000 dwt as described in the following table and notes.

The breakdown of costs for January 1961 is given in Table II, with comparative figures for January 1960 and 1959. It will be seen that during the last twelve months there has been a slight increase in material costs and a rather larger increase in labour costs following the latest wage award to engineering workers which came into effect on 26 December last.

Details of Specification

Group 1. This item includes the cost of all steelwork based on a total weight of steel and forgings and castings of 3,300 tons, but the item also includes about 30 tons of smith work and davits. The design of ship for which this weight of steel is included is of the normal open shelterdeck type, with a long forecastle and a raked stem and cruiser stern. There is a double bottom fore and aft for the carriage of oil fuel, water ballast and fresh water. There are five cargo holds and tweendecks with a deep tank for the alternative carriage of cargo or water ballast.

A steel centreline bulkhead is fitted in the holds and tweendecks clear of the hatchways. The tank top is increased in thickness in way of the hatchways in lieu of wood ceiling. The vessel has large hatchways with roller hatch beams on all decks and wooden hatch covers in slab form. The vessel is to Lloyd's Register ✠ 100 A1 classification.

Group 2. The deck auxiliaries are all steam driven including the winches, and steam hydraulic steering gear. The domestic refrigerated stores have a cold store capacity of 2,000 cu ft, the plant being of the methyl chloride-freon type.

Group 3. The vessel has a comprehensive system of cargo handling, which includes one 50-tons heavy-lift derrick, one 20-tons derrick and ten 10-tons derricks at the main hatchways. Included in the price are ten 8-in by 12-in totally enclosed steam winches and one 8-in by 12-in warping winch. The cost includes the provision of all normal piping and all accommodation fitted entirely amidships, with the crew in two-berth cabins, the crew and petty officers being berthed in the shelter tweendecks.

Group 4. The cost of the main auxiliary machinery in the engine room includes the provision of a modern type of marine diesel engine of 4,500 bhp at 115 to 120 rpm and two cylindrical multi-tubular boilers with exhaust or oil firing. The price also includes two 35-kW, 220-volts DC steam generators and one 31-kW emergency diesel generator, as well as the normal pumps for such a vessel.

Group 5. Includes the cost of insurance during building, classification fees and all overhead charges including allowances for holidays, national insurances, foremen and yard management; the provision of power, light and fuel, establishment charges and a profit margin.

TABLE I—Principal Ship Particulars

Length b.p.	435ft
Breadth moulded	60ft
Depth moulded to upper deck	39ft
Deadweight	10,000 tons
Draught	26ft 6in
Gross tonnage (about)	5,900 tons
Net tonnage (about)	3,500 tons

Machinery:
Single-screw modern type of diesel engine of about 4,500 bhp at 115 to 120 rpm, service speed 13½ knots.
Auxiliary machinery steam-driven from two cylindrical multi-tubular Scotch boilers with exhaust and/or oil firing, producing steam at 120 lb per sq in.

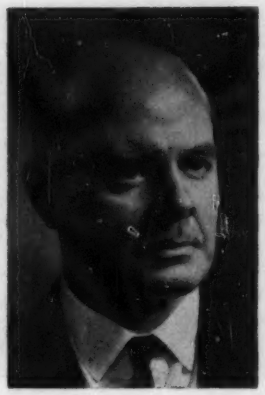
TABLE II—Analysis of Construction Cost

Item	January 1959				January 1960				January 1961			
	Material cost (£)	*Labour cost (£)*	*Total cost (£)*	*Per cent*	*Material cost (£)*	*Labour cost (£)*	*Total cost (£)*	*Per cent*	*Material cost (£)*	*Labour cost (£)*	*Total cost (£)*	*Per cent*
1. Steelwork, forgings, castings, smith work, davits, etc.	159,915	73,385	233,300	24.28	160,100	73,385	233,485	24.26	158,000	76,750	234,750	23.72
2. Deck machinery and equipment, including domestic refrigerating machinery	93,550	8,720	102,270	10.65	93,975	8,720	102,695	10.67	96,350	9,000	105,350	10.64
3. Ship outfitting, including piping, accommodation, decking, plans, painting, etc.	54,675	59,325	114,000	11.87	54,865	59,325	114,190	11.86	54,865	59,325	114,190	11.61
4. Main and auxiliary machinery in engine room, including generators and wiring	227,835	89,785	317,670	33.06	228,370	89,785	318,155	33.06	237,100	98,150	335,250	34.23
5. Overhead charges, insurances, classification fees, holidays, profit margin, etc.	—	—	193,530	20.14	—	—	193,935	20.15	—	—	194,885	19.80
	£536,025	£231,215	£960,770	100.00	£537,310	£231,215	£962,460	100.00	£546,315	£243,225	£984,425	100.00

British Shipping Today

TECHNICAL DEVELOPMENTS OF THE YEAR

By R. Stewart MacTier, C.B.E.



Chairman of the Liverpool Steam Ship Owners' Association and Chairman of the General Council of British Shipping

THE YEAR 1960 has been one of considerable importance in the technical sphere of shipping. One of the principal events was the International Conference on Safety of Life at Sea; called by IMCO and held under the chairmanship of Sir Gilmour Jenkins, leader of the United Kingdom delegation. Fifty-four nations participated in the Conference, which drew up a Convention for Safety of Life at Sea.

A happy feature of the Conference was its absence of political argument in technical session and the obvious desire on the part of all concerned to get ahead with the job at hand. This was adequately demonstrated by the volume of work covered within a period of one month, entailing substantial revision of six chapters and the formulation of a new chapter covering nuclear ships.

Technical Development

The rapid technical development which has taken place over the twelve years since the last Conference was held in 1948 is shown in the revision of the Convention and highlighted by the new chapter on Safety of Nuclear Ships, the Radar Guide annexed to the Collision Regulations and the introduction of inflatable liferafts as part of lifesaving appliances.

There were substantial differences of view, as there were bound to be in a conference of this order, representing many different national viewpoints, but nevertheless many important matters were settled unanimously. To instance but one, the new Radar Guide to be annexed to the Collision Regulations which, it is gratifying to note, substantially follows the proposals put forward by the United Kingdom.

Preparatory Work

Perhaps a less known aspect of the Conference was the amount of preparatory work done in advance by the United Kingdom. For some two years before the Conference, working parties set up by the Ministry of Transport met regularly, first to draw up the United Kingdom proposals and later to examine proposals put forward by other Administrations. British shipowners were well represented on these working parties, which examined carefully every proposal submitted to the Conference. The amount of work thus entailed was considerable indeed, but there is no doubt that this preparatory work played an essential part in the successful outcome of the Conference, putting the United Kingdom in a position to discuss in detail the exact effect of every proposal put forward.

It may be that this Safety Conference will prove to be the last of its kind in handling so large a volume of work, since the IMCO Maritime Safety Committee is likely to deal progressively over the years with matters which have hitherto been "saved up" for the International Conference. This would mean that much of the work that now comes before the Conference when it meets at infrequent periods will instead be handled by a standing committee of IMCO in more or less permanent session.

One of the outstanding features in the many changes which have taken place in the Red Ensign fleet over the past twenty years has been the heavy fall in our tonnage of passenger ships. This class of ship has always excited the keenest public interest, and so its decline has been interpreted in some quarters as being symptomatic of a general weakness in British shipping. In fact there are good reasons for this decline, the chief being that with the huge increase in overheads represented by passenger accommodation and the staff required to attend to passengers, the mixed passenger-cargo ship is no longer economically viable in the majority of trades.

However that may be, 1960 was a memorable year for the lovers of passenger ships. Royal Mail Lines took delivery of three 20,000-tons liners. The *Windsor Castle*, of 37,640 tons, was delivered in July—the largest and fastest ship ever built for the South African service, while the *Oriana*, taken over by P & O-Orient Lines in November, is outstanding both technically and in the facilities she offers as a passenger carrier. Apart from these five liners the P & O *Canberra*, of 45,000 tons, was launched in March and the Canadian Pacific *Empress of Canada*, of 27,300 tons, was launched in May.

Higher Speeds

As to other classes of ships, we have witnessed the progressive increase in the speed of cargo liners in most trades, a fact which is symptomatic of the steep rise in overheads as a percentage of total voyage costs, and of the inducement which this provides to cutting round voyage times by higher speeds. Today a 17-knots service speed is common among modern vessels in many of the cargo liner trades.

In spite of an acutely depressed freight market a number of notable tankers were launched and delivered during the year for account of British owners, and an interesting development during the period was the increase in specialised tonnage built for the carriage of liquid petroleum gas.

There was a falling off in deliveries of conventional general-purpose tramps, but of total tramp building specialised bulk carriers represented an increased percentage. It is interesting to note that British owners have tended to build what today would be described as handy-sized bulk carriers—that is, not exceeding

about 14,000 tons deadweight—whereas the Scandinavians have built ore carriers up to double this size, obviously on the basis of securing long-term charters in the restricted trades where such very large ships can be employed.

The year was notable in the field of marine propulsion chiefly for the introduction into service of the Burmeister & Wain 840-mm poppet valve diesel engine developing over 2,000 shaft horsepower per cylinder, and the testbed trials of the Sulzer 900-mm engine with similar output. These developments have made it possible for diesel machinery, with its lower fuel costs, to compete with turbines for use in the largest tankers and the fastest dry cargo liners.

Nuclear Propulsion

Lastly, it is perhaps worth commenting on the vexed question of nuclear propulsion. There has been a certain amount of criticism, both in Parliament and in the Press, of the failure of the Government and the shipping industry to get ahead with the building of a nuclear-propelled merchant ship and so take the lead in this new form of propulsion.

Critics seem to fail to appreciate that the British shipping industry is a commercial undertaking which can only interest itself in building and operating ships which are commercially viable. At the present time there appears to be no reason to suppose that any known type of reactor, when installed in a merchant ship, will provide an installation which will compete with conventional machinery, the only possible exception being in the range of the very largest passenger liners, where a power of 80,000 shaft horsepower or more is called for.

There may be a case for building a nuclear-propelled merchant ship for Government account as a research unit, with the full knowledge that it can only be operated at a loss. This is what the United States Government has done in building the *Savannah*, and undoubtedly this ship will provide valuable operating experience. Whether the British shipping industry would be justified in pressing Her Majesty's Government to take similar action seems at least doubtful.

In conclusion it may be said that though the British shipping industry is going through an extremely difficult period commercially speaking, from the point of view of technical progress the industry is very much alive.

THE St Lawrence Seaway Development Corporation has reported that cargo tonnage through the Seaway declined by 1.3 per cent in 1960 from the 1959 total. An increase in downbound tonnage was more than offset by the decrease in upbound cargo.

International Trade 1959, the latest annual report of the General Agreement on Tariffs and Trade (Sales No GATT/1960-3, price US$2.00 or equivalent), contains three parts. The first analyses recent trends in international trade; the second deals with recent trends in commodity trade; and the third part examines the trade of areas and countries.

A BOOKLET with the title *Guss im Schiff* (which may be translated as "Casting Work in Ships") has been published by the Zentrale fuer Gussverwendung at Duesseldorf. It is No 8 in a series on the applications of castings. Examples given of recent applications of large castings for ships include the stem piece and A-brackets for the P & O liner *Canberra*, which were cast in Germany.

(*Continued from facing page*)

industrial buildings and factories, dry docks cannot be constructed in particular spots simply by reference to geographical employment problems.

It is to the credit of the industry that despite lack of encouragement in any of the forms asked for, firms have gone ahead with the development of dry dock facilities. This is evidenced in 1960 alone by the opening of the new Henderson Graving Dock by the Humber Graving Dock & Engineering Co, Immingham, by the construction of a new dry dock for the Mercantile Dry Dock Co at Jarrow, and by the completion during the year of extension and reconstruction work on existing dry docks by Austin & Pickersgill, Grayson Rollo & Clover Docks and Swan, Hunter, & Wigham Richardson. Meanwhile, work proceeds on Vickers-Armstrongs' new dry dock at Hebburn-on-Tyne, completion of which is expected in 1961, and on an extension and reconstruction project at Cammell Laird. The year, of course, is also notable for the decision to go ahead with the large new graving dock at Greenock.

When looked at in conjunction with new dry docks completed and reconstructed in earlier years the record is impressive: but there is still much to be done, and there are many dry docks which cannot be used economically today because, largely on account of breadth, they are unsuited for the dimensions of modern ships. We hope, therefore, that the Government will not be deflected from consideration of the industry's case for special treatment simply because of what has already been done. Their encouragement is no less necessary today than at any time hitherto, and by meeting the claims of the shiprepairers they can demonstrate their professed concern for the welfare of one branch of our vital maritime industries.

Burden of Local Rating

Reference has already been made to the high initial cost of dry docks, and this turns attention to another matter of great concern to the shiprepairing industry, namely the burden of local rating. The existing burden is serious enough, but newly constructed dry docks produce high valuation figures and we are faced with a 1963 revaluation which will no doubt increase these still further. If, in addition, the Government terminates the system of industrial derating (already reduced from 75 per cent to 50 per cent) this will be a heavy blow and one which an industry such as shiprepairing should not be asked to shoulder. Derating has been under constant attack in recent years and to some industries its loss may not be of tremendous importance. To an industry with a high proportion of rateable assets it can be serious indeed, remembering that rating is a burden which must be met year by year whether firms are actively employed or not. Special cases may make bad law, but to ignore their existence can be disastrous and provision to deal with them is essential.

If shiprepairers enter upon a new year with confidence in the efficiency of their establishments and in their ability to go on meeting the sharp challenge of intense competition, they do so with no illusions as to the reality of that challenge. Shiprepairing is a servicing industry and in performing its function must be imbued with the idea of service, which calls for many qualities from everyone connected with it.

Shiprepairing in Britain

A HIGHLY COMPETITIVE INDUSTRY

By George Morrison, O.B.E.



Chairman, Dry Dock Owners and Repairers Central Council

SHIPREPAIRING, like shipbuilding and marine engineering, is prosperous only when shipping is in good shape, and in recent years shipping has been depressed, with still few signs of any marked upturn in activity. It follows that this reflects itself in the volume of work available to the shiprepairing establishments throughout the country. Big modernisation jobs are postponed, the number of conversions tends to shrink, and with a large amount of shipping laid up even the amount of running and care and maintenance repairs is less. Perhaps the feature of leaner times for shiprepairers is the patchy irregularity of the work offering and, of course, a sharp intensification of foreign competition for the available jobs.

We read of repair work on British ships going to the Continent, but in the same way work on foreign ships can be and is attracted to the United Kingdom in this highly competitive international industry. There can be no thought of protective measures for shiprepairing, and it may be taken as proof of our competitive ability that one can say with confidence that U.K. shiprepairers (and therefore the workpeople in the repair yards) would stand to lose more than they would gain by anything of the kind.

The Repairers Central Council since 1957 has been collecting statistics of the value of work on foreign-flag ships. In 1957 and 1958 (based on somewhat incomplete returns) nearly 9 per cent of all repair work was "export": in 1959 it represented 12½ per cent and in 1960 the final figures are likely to show about 11 per cent of the total as coming within this category.

Fall in Value of Work Done

The total value of shiprepair work calculated by reference to wages paid (in the absence of an end product it is not easy to put an accurate measure on the output of a servicing industry) reflects the decline in activity since the tide turned for shipping in 1957. For 1957 the value of all work done was of the order of £62 million: for 1960 it is doubtful if it will exceed £50 million, which represents a drop of 19 per cent. The same feature is disclosed by numbers employed because, whereas in 1957 over 40,000 workpeople were engaged in shiprepairing, these dropped in 1960 (an average of the first nine months) to just over 32,000. In prewar years an employment figure of 30,000 in shiprepairing was regarded as normal and the facts stated confirm the tendency, noted in earlier year-end reviews in THE SHIPPING WORLD, towards a return to that level.

Much money has been spent in recent years on modernisation schemes and the installation of new machinery and equipment. The forces of competition are such that no firm can be inefficient and still survive. The yards round our coasts are thoroughly modern and up to date and great strides have been made in one inevitably costly direction—namely, the provision of dry docks of a size adequate to handle the ships of today, which tend in all categories to become larger as regards both length and beam.

It seems almost tedious to refer once again in a year-end review to the subject of taxation allowances for dry docks, but the matter is of such importance to the shiprepairing industry and to the national economy that no apology is required for returning to it. The industry has been profoundly disappointed that repeated representations to successive Chancellors of the Exchequer over many years have failed to produce any result in the form of better taxation allowances which would encourage this singularly unattractive form of investment. It is unattractive because the construction of new dry docks or the modernisation of existing dry docks is extremely costly and because, on the basis of internationally competitive dock rent charges, there can be little or no financial return on the investment for many years. The shiprepairers have asked for no more than the best treatment accorded to other forms of investment and so, once again, the Government is being pressed to concede in respect of expenditure on dry docks an investment allowance of 40 per cent (equivalent to what is available for investment in new ships) and an annual allowance of 5 per cent (equivalent to a "plant" rather than the existing "buildings" allowance).

Taxation Allowances Abroad

In fact, these are modest requests when set against the taxation allowances available to our Continental competitors, some of whom have been able to construct modern dry docks from monies entirely free of tax. The cost to the Exchequer, if our claim were conceded, would be small indeed, while its stimulus to the industry would be very great. The provision of modern dry docks in this country, designed for present-day needs, is of vital strategic as well as economic concern, and some departure from the hitherto strictly orthodox thinking of the Government in this respect is urgently required.

Admittedly in certain limited circumstances some help can be obtained, and has been given, through the operation of the Local Employment Act, for dry dock projects; others equally deserving have failed to qualify through not being able to meet the conditions imposed, and this points to the fact that the legislation does not meet the basic problem of the industry. Unlike

(*Continued on facing page*)

Reversing Gas Turbines

POSSIBLE SCHEMES FOR FREE-PISTON MACHINERY

By N. M. Clark, Chief Engineer, Power Jets (Research & Development) Ltd

IT WAS about five years ago that free-piston engines first appeared on the scene as marine propulsion units. During this period, the number of ships built or re-engined with free-piston machinery has been relatively few and, if the fleet of French coastal minesweepers is considered as a single ship, they could be counted on the fingers of two hands. This is not to say that marine engineers have shown no interest in this form of prime mover; in general, however, the attitude has been one of sitting on the fence.

It is not altogether surprising that the mercantile marine world has been so reluctant to take on a new type of machinery at a time when charter rates were falling to such a low level that only diesel-engined ships were able to operate profitably, and therefore an alternative propulsion system could only be considered if it promised a reduction in the fuel bill, either by a remarkably low consumption or by being able, without loss of reliability, to burn fuel oil blends containing substantial amounts of residual oil. Thus, the trend of the economic situation has been more favourable to the diesel engine which, besides being well tried under sea-going conditions, was also overdue for a development stage based on the rapid technological progress of the 1950's.

It is regrettable that these factors have combined to deter owners from investing in the free-piston engine system, which has undoubted advantages; with the result that development of the engine and accumulation of working experience, both of which are essential to the success of a marine engine, have been disappointingly slow. The potential advantages which the free-piston engine has over the diesel engine have been discussed at length in a number of papers, by Beale & Watson, Muntz & Huber, and McMullen, to name only a few. Besides showing considerable savings in space (particularly in height) and weight, allowing standby capacity and being easier to maintain, the free-piston gasifier/turbine combination is capable of giving a fuel consumption which is low enough, when using a medium grade of fuel oil, to show an overall reduction in fuel cost. There is, therefore, no fundamental reason why the free piston engine should not be a worthwhile proposition for marine propulsion and receive a fair share of the development effort, on both gasifiers and turbines, which will undoubtedly result in improved performance and reliability.

Important Role of the Turbine

The turbine, being only the slave of the gasifiers, so to speak, is often taken very much for granted. It is, however, as important a contributor to the performance of the system as the gasifiers themselves, since the overall efficiency is directly proportional to the efficiency of the turbine. Moreover, complete reliability is essential, as a ship with more than one gasifier can get home if one is out of action, but with only a single turbine a breakdown would be disastrous.

Of equal importance to the efficiency of the expansion process in the turbine is the correctness of the "matching" of the flow capacity of the turbine to the output of the gasifiers. If the swallowing capacity of the turbine at the gasifier delivery pressure corresponding to the maximum rating is greater than the gasifiers will supply, then the gasifiers will reach maximum stroke before reaching maximum pressure and, since the specific fuel consumption in lb/gas horsepower-hr worsens with reduction in delivery pressure, the overall consumption is correspondingly affected.

Gasifiers in their present state of development have a specific fuel consumption at full load of around 0.33-0.34 lb/ghp-hr. Some reduction in this figure is to be hoped for as a result of further development, though there are numerous sources of unavoidable loss—e.g. throttling through automatic valves and mixing losses—which may not be capable of much further reduction under the present system. It is not the purpose of this article to speculate on the possibility of a gas generator being developed with a fuel consumption more in the region of 0.30 lb/ghp-hr; but if it were, there would be practically nothing to choose between the free-piston turbine combination and the diesel as far as fuel consumption were concerned.

All this presupposes that an overall expansion efficiency—including ducting losses and mechanical losses in the reduction gear—exceeding 80 per cent is possible. In the case of a marine propulsion unit, there is also the provision of astern power to be considered. To achieve this efficiency, the parasitic losses must be kept to a minimum, and the turbine must be carefully designed for optimum performance. Bearing this in mind, the author intends to review the possible turbine arrangements for marine propulsion, the engineering problems involved and the effect of each system on performance and comparative costs.

Five Methods of Ahead/Astern Propulsion

Leaving aside turbo-electric propulsion, five mechanical transmission systems are adaptable to marine propulsion.

1. Non-reversing turbine with variable-pitch reversible propeller.
2. Non-reversing turbine with epicyclic or other reverse-reduction gear.
3. Non-reversing turbine with ahead/astern drive through fluid coupling/torque converter.
4. Reversing turbine with astern wheel solidly coupled to main turbine shaft.
5. Separate astern turbine with automatic coupling device.

Reversible Propellers.—This scheme is obviously a practical one: indeed, it has a good deal to recommend it

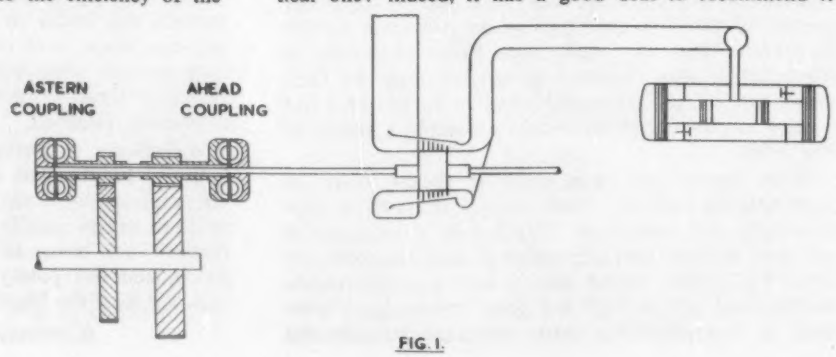


FIG. 1.

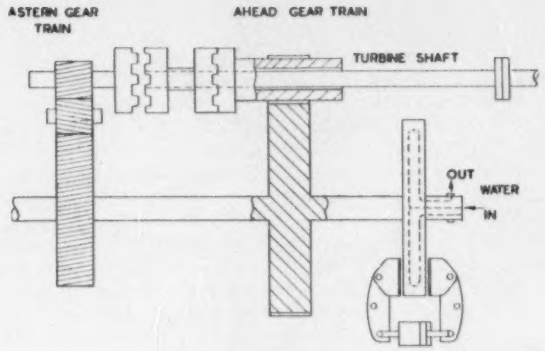


FIG. 2.

and is being used in German trawlers built by Rickmerswerft and in the 12,500-dwt vessel *Rembrandt* of the Bolton Steamship Co Ltd engined by Smiths Dock Co Ltd (*SW*, 10.8.60).

It is undoubtedly efficient, since it allows a straightforward turbine without compromise, and a simple reduction gear. The reversible propeller at normal pitch is practically as efficient as a fixed-blade screw, there being only a slight loss due to the large hub necessary to accommodate the blade roots, and is mechanically reliable without a doubt.

Its disadvantages lie first in the high initial cost and cost of replacement if it should be necessary, secondly in the greater vulnerability to damage, which could put the ship out of action and also could be extremely difficult to repair. These are questions which may be expected to influence one shipowner more than another, but in the case of a large proportion of single-screw vessels which may be in charter service, the possibility of unforeseeable circumstances makes the risk too high for the majority of owners to be willing to accept.

Reverse-Reduction Gearing.—Here the complexity of the variable-pitch propeller is exchanged for that of a reversible transmission, the great advantage being that the complex part is less likely to be affected by propeller fouling and can be got at without dry-docking. The cost is likely to be high: much higher than that of a reversing turbine and of the same order as a reversible propeller.

The main problem is that of engaging reverse gear while the shaft is in motion under the combined effects of inertia and the propeller trailing through the water. Should friction clutches alone be used, all the energy from both sources must be dissipated by slipping of the clutch members: if the clutches are in the form of brakes on the annulus and planet carrier respectively of two epicyclic gear trains, it is possible to give them a reasonably large work-absorbing capacity, but the problem becomes very severe and the cost correspondingly high when powers over 1,000 hp are involved.

Alternative Systems

Various alternative systems can be evolved enabling higher powers to be dealt with safely. Fig. 1 shows diagrammatically a constant-mesh gearbox with two traction-type fluid couplings which may be filled and emptied as required for ahead or astern operation. The disadvantages of this scheme are first that it is bound to be costly, in common with all fluid-coupling schemes, and secondly the combined mechanical losses, due to slip in the main coupling, windage in the counter-running astern coupling and the losses in the idle gear train, are bound to amount to 2 or 3 per cent.

Another possibility is shown in Fig. 2. A powerful brake is fitted to the propeller shaft, or to an intermediate shaft, to bring the propeller to rest in a matter of a few seconds—the shorter the time the bigger the torque required, but the smaller the energy to be dissipated when the ship is under way because of the steady torque of the trailing propeller. The heat liberated is removed by cooling water which would be necessary when frequent changes in direction are occurring. Either of the two constant-mesh trains can be engaged while the shaft is stationary, a small trickle of gas through the turbine allowing the clutches to engage easily. With a proper system of interlocks, there is no reason why this scheme should not be quite practical, as the brake duty is on a par with large mine-winding brakes which have been used for many years. One would expect to get a fair amount of noise from the gears which would be temporarily overloaded during application of the brake, but the duration would be too short to be objectionable.

Reversing by Fluid Couplings.—The use of a torque converter is one way of changing the speed or direction of rotation of an output shaft relative to an input shaft. Two couplings are of course required, a normal traction coupling for the ahead drive and a converter for astern; the input and output of both couplings are connected to the turbine shaft and reduction gear pinion respectively and the couplings are filled and emptied as required. The PAMETRADA gear installed in the Shell tanker *Auris* is a fully developed example of this type, transmitting 5,500 shp from a BTH orthodox gas turbine. In order to obtain maximum efficiency the ahead coupling is short-circuited for open-sea running by a specially developed hydraulically-operated plate clutch.

As might be expected, the complete transmission system is a fairly complicated piece of mechanism, requiring auxiliaries and a considerable amount of control gear; it is therefore somewhat expensive. The astern power is limited to about 60 per cent by the relatively inefficient torque converter, but this is normally more than adequate.

Reversing Turbines with Solid-coupled Astern Turbine.—Following steam turbine practice, except that the ahead turbine is all in one casing, most of the free-piston turbines built for marine propulsion so far have employed integral astern turbines, with a two-way proportioning valve between the gasifiers and the turbine inlets. This arrangement has the merit of simplicity of mechanism, although the ducting between the gasifiers and the turbine is a little more complicated. To offset this slight disadvantage, however, is the fact that the gas by-pass valve, which is necessary with any non-reversing turbine, is omitted, together with its servo-control: in fact, the proportioning valve is virtually the same device. Furthermore, as has been effectively demonstrated, very rapid changes of turbine speed can be brought about and the machinery can be held stationary or inched in either direction quite easily in response to the movement of a single manoeuvring handwheel, which simultaneously varies two separately modulated oil systems controlling the gasifier fuel racks and the proportioning valve respectively. The basic elements of the control system are illustrated diagrammatically in Fig. 3 and the turbines of this type installed in the *Morar* and the *Robert W. Vinke* have been described and illustrated in THE SHIPPING WORLD of 25 February 1959 and 2 November 1960.

The principal problem with this system is that of the windage losses in either turbine when being driven round in reverse of their normal rotation, particularly inasmuch as the loss due to the astern wheel when running ahead is a steady drain, which directly affects the fuel consumption. Also, if the loss is very great, overheating of the blading may occur, resulting in damage.

In general, steam turbines do not suffer from the same kind of problem, as the astern turbine casing is evacuated to the condenser. It is not, however, a very practical proposition to exhaust the casing of a gas turbine, owing to the difficulty of blanking off the exhaust duct with a pressure-tight valve.

Various designs of astern turbine have been used in an effort to keep down the windage loss, mainly single or two-row impulse wheels, with different forms of mask, designed to discourage parasitic circulation of exhaust gas through the blades of the astern turbine. Fixed masks, which encourage the windage gas to move in a closed circuit, and movable two-position masks which blank off the blade annulus altogether have been tried. The biggest improvement, whereby the windage loss may be cut to negligible proportions, is the mask on both sides of the wheel which has been developed by Rankin & Blackmore in collaboration with Power Jets (R & D) Ltd, and incorporated in the latest Rankin & Blackmore turbine in the *Robert W. Vinke*. A detailed description of the design and operation of this mask appeared in The Shipping World of 28 December 1960. At present, this device has only been used on a single-stage astern turbine, although it could be extended to cover a two-stage wheel if required. With a single-stage turbine, the astern power, after deduction of the windage losses in the multi-stage ahead turbine, is limited to somewhere between 35 and 40 per cent of the ahead power. While this is adequate for some types of vessel, it could be a serious disadvantage in certain cases.

It might be thought that overheating of the astern blading due to being more or less totally enclosed might occur, but it would appear that the losses are so much reduced that the heat generated can be dissipated through the casing. If the ahead turbine is not ventilated when running astern for a considerable time, there is a danger of overheating the ahead blades. It has been found, however, that if a small by-pass line is fitted from the ahead inlet to the exhaust, with a diaphragm-controlled valve which is opened when running astern, the high-reaction blading of the ahead turbine acts like a compressor and promotes a flow of gas which removes the heat.

A proposal has been made for a direct-reversing turbine of the radial-flow type having pivoted nozzles which may be moved right round to the astern direction. While this is an interesting proposition, it is unlikely that the efficiency of a single-stage radial flow turbine will be as high as that of a multi-stage axial, and the rotor would be rather highly stressed.

Astern Turbines with Coupling Devices.—Since the astern turbine is normally in use for such a very small total time, the idea of disengaging it except when required is an attractive one, provided that the means provided for coupling it on quickly while the main turbine is still revolving is quick in operation, utterly reliable and not too expensive.

An arrangement resembling Fig. 2 but with a straightforward reduction gear and separate ahead and astern turbines driving the main pinion through fluid couplings is one obvious possibility. Apart from the expense, however, there is the problem of the disposal of heat generated in two fluid couplings operating against each other at 100 per cent slip (although at a fairly low power level) when engines are put to "stop" during manoeuvring. This power will have been unnecessarily converted into shaft power in the turbine and back into heat in the coupling, whereas in the integral-turbine scheme previously described, the stationary turbines develop no power at all and the gases leave the turbine without any temperature drop.

Other arrangements utilising fluid couplings of a smaller size—not designed to transmit full power or to slip continuously—together with friction clutches to take over the drive when near synchronism, are also possible. Some simplification is possible by making the astern turbine drive through the ahead one which, being permanently connected to the reduction gear, does not require a fluid coupling; there is thus only one such coupling required.

The use of a positive clutch is difficult owing to the necessity for close synchronisation, even if a fluid coupling is used to trail the astern turbine up to near synchronous speed first. The only type of clutch which can at present really be relied upon at high speeds and powers is the self-synchronising or over-running clutch which can be locked in once engaged, so as to transmit torque in either direction without disengaging. If such a device is used, some arrangement must be made to speed the astern turbine up in the "ahead" direction until it tries to overtake the ahead turbine. This leads to an arrangement as in Fig. 4. An electric motor with step-up gear could be used to spin the astern turbine when required,

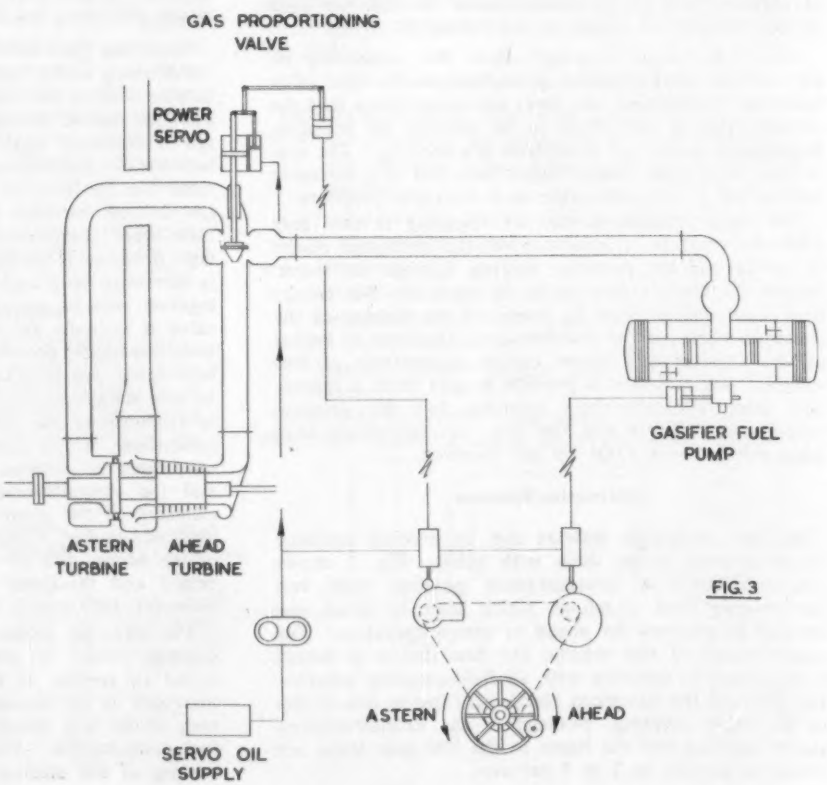


FIG. 3

but reliance on electrical systems for emergency stops is probably undesirable.

The fact that power fluid (in the form of gas) is available in large quantity (and surplus to requirements at the moment an emergency "stop" order is received) gives rise to the idea shown in Fig. 4. Here, a radial flow astern turbine is shown and is provided with an auxiliary nozzle through which gas is directed on to the rotor in the normal "ahead" direction when diverted through a special valve, before the astern turbine nozzles are opened. The astern turbine speeds up rapidly on no load and, as it tries to overtake the ahead turbine, is coupled to it by the over-running clutch, which is then locked in engagement. Subject to the over-riding control of a simple interlock arrangement, the gas is then quickly diverted to the astern turbine or to both turbines as may be required. The operation of the system in the manner just described would take place only when an order to "stop" or "stand-by for manoeuvring" is received after a long run ahead; for starting up and normal manoeuvring, the clutch would remain engaged and the whole system would operate exactly as the integral-astern turbine type. When the astern turbine is no longer required, the clutch would disengage automatically on release of the locking mechanism.

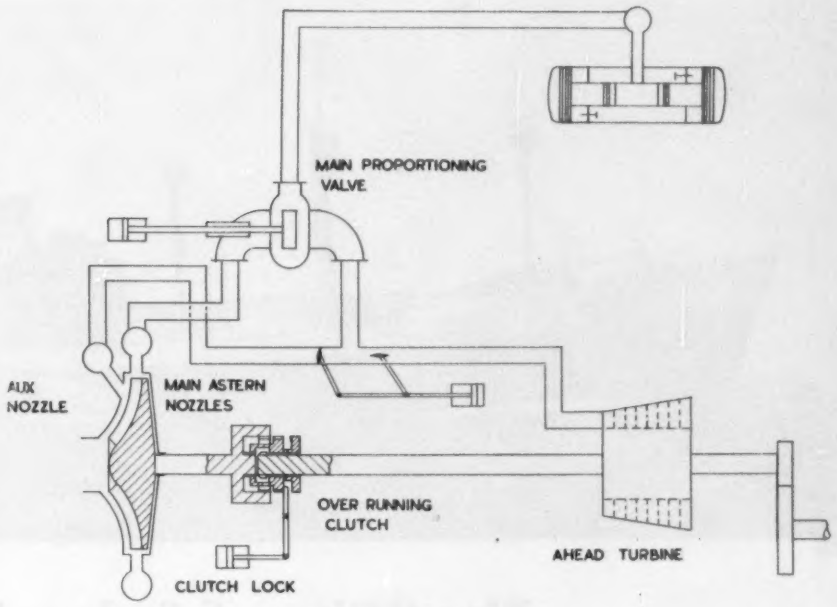


FIG. 4

Two points about this system are worth mentioning. The first is that a more efficient astern turbine can be designed, either as a radial or a two-stage axial machine, because windage is no longer a problem, and thus astern power (net) of up to about 80 per cent of the ahead power can be provided. The second is that the astern turbine in a separate casing could be made a very simple and cheap unit: it might even be cheaper overall to have a smaller diameter wheel and an intermittently-rated reduction gear on the astern turbine side of the clutch; however, so far as the author is aware, this has not yet been studied in detail. Lastly, the removal of the astern turbine from the ahead turbine casing does bring other secondary benefits, particularly by reducing the length of the shaft between bearings and thus enabling it to be made smaller and lighter for the same degree of stiffness and perhaps enabling a better exhaust diffuser to be fitted to the ahead turbine, which might gain another ½ per cent of efficiency.

Although it has yet to be proved in service, this scheme does not involve anything basically new in engineering practice and should therefore require little development: at the same time, it seems that it should be economically attractive, especially for higher powered installations, and the author hopes that it will be tried out before long.

CUNARD EAGLE AIRWAYS (BERMUDA) LTD has become an active member of the International Air Transport Association. An associated company, Cunard Eagle Airways Ltd, of London, is also an active member of IATA. Both are divisions of the Cunard Steam-Ship Company.

ENGLISH ELECTRIC IN 1960

Review of Work

MARINE work carried out by the English Electric Co Ltd in 1960 included machinery for both merchant vessels and warships. Deliveries of naval machinery included main propulsion steam turbines for *Whitby* class frigates, electrical propulsion equipment for submarines and steam turbo-driven auxiliary generating sets.

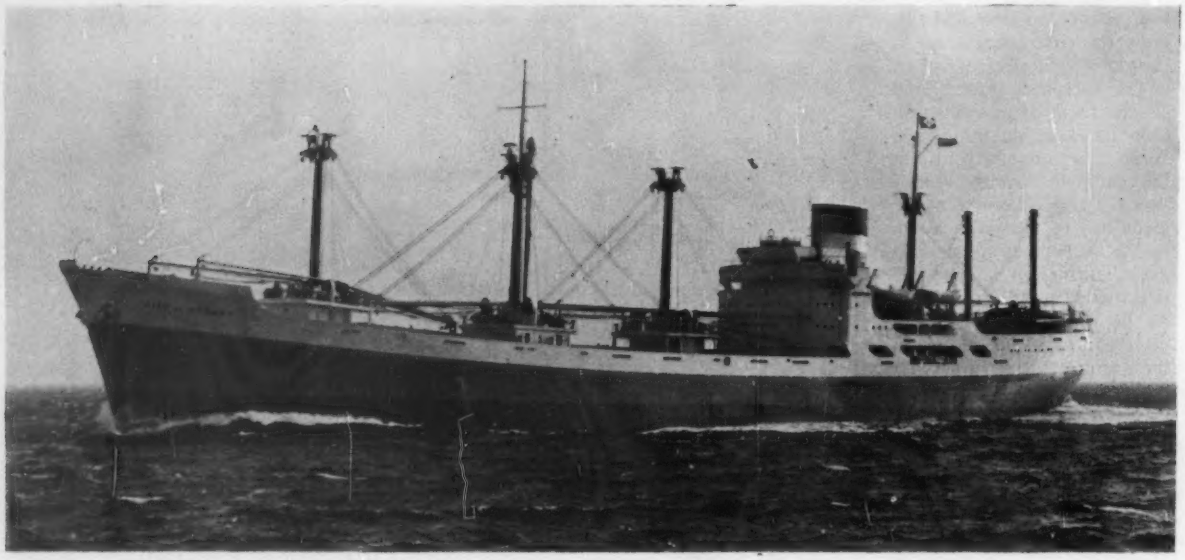
Two important orders received for diesel-electric propulsion machinery destined for merchant ships were the 9,000-shp twin-screw installation for the new passenger and vehicular ferry intended for service across the Cook Strait, New Zealand, and the 2,100-shp machinery for Britain's first "freezer" trawler. Orders for main propulsion diesel engines, auxiliary diesel generating sets, steam turbo-alternator sets, auxiliary motors and switchgear for merchant ships were also received.

Among installations completed and commissioned were the diesel-electric propulsion machinery for the Trinity House vessel *Siren* and several geared diesel engines in coasters and a supply vessel for Shell.

The most important aspect of English Electric activities in the marine switchgear market was the delivery to Harland & Wolff, Belfast, of the largest AC switchboard ever to be built into a British ship. This 38-circuit switchboard, consisting entirely of 415-volts switchgear, has a total length of over 70ft and has been fitted into the new 45,000-tons P & O liner *Canberra*.

THE MINISTER OF PENSIONS & NATIONAL INSURANCE has made new regulations which lay down rules for the payment of graduated contributions by shipowners and seamen. They show how ships' masters will calculate these contributions, how they will deal with advances of pay, allotments, sick pay, bonuses, commission, etc. (National Insurance (Mariners) Amendment Regulations, 1960. S.I. 1960 No 2431, price 9d from HM Stationery Office.)

THE AMERICAN shipowner, Mr Erling D. Naess, and the Möller shipping companies at Copenhagen have formed a new shipping company under the name Dampskibsselskabet of 1960 A/S, with a capital of Kr 8,000,000. The first directors include Mr Maersk McKinney Möller as chairman and Mr Erling D. Naess, and Messrs A. P. Möller as the managing owners.



The "City of Sydney"

NEW CARGO LINER FOR ELLERMAN LINES LTD

DURING THE latter part of last year the Ellerman Lines Ltd, London, took delivery of the cargo liner *City of Sydney* for the company's service between U.K. and Australian ports. This vessel, which has a deadweight of 11,750 tons and a service speed of 17½ knots, has been built by Barclay, Curle & Co Ltd, Glasgow. She is attractively proportioned and built on modern lines with the machinery space well aft—between Nos 4 and 5 holds—and insulated space for the carriage of refrigerated cargoes.

Propulsion is by a Barclay Curle-Sulzer diesel engine, the first that the firm has built since recently it took out a licence from Sulzer Brothers. This is a nine-cylinder turbocharged engine capable of developing a maximum output of 10,400 bhp at about 115 rpm, arranged to burn heavy oil fuel.

The principal particulars of the *City of Sydney* are as follows:—

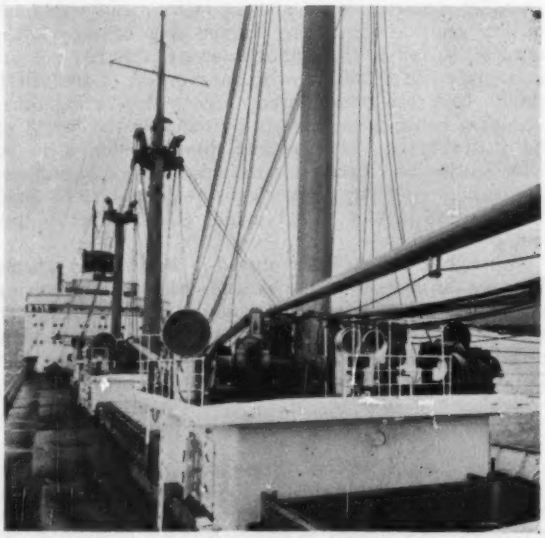
Length o.a.	511ft
Length b.p.	470ft 8½in
Breadth, moulded	67ft
Depth, moulded to shelterdeck ...	42ft
Depth, moulded to second deck	32ft
Draught	30ft
Deadweight	11,570 tons
Gross tonnage	10,550 tons
Block coefficient	0.678
Machinery output	10,400 bhp
Service speed	17½ knots
Cargo capacity:	
Bale	489,040 cu ft
Grain	543,280 cu ft
Refrigerated (net)	104,290 cu ft
Chilled beef	22,680 cu ft

The *City of Sydney* is of the closed shelterdeck type with forecastle, cruiser stern and raked rounded stem. The double bottom tanks are arranged mostly for the carriage of oil fuel or water ballast, the aftermost tank being arranged for feed water. Fresh water is carried in the fore and after peaks. Side bunkers on each side of the engine room and a cross bunker at the after end of No 3 hold are arranged for the carriage of fuel oil.

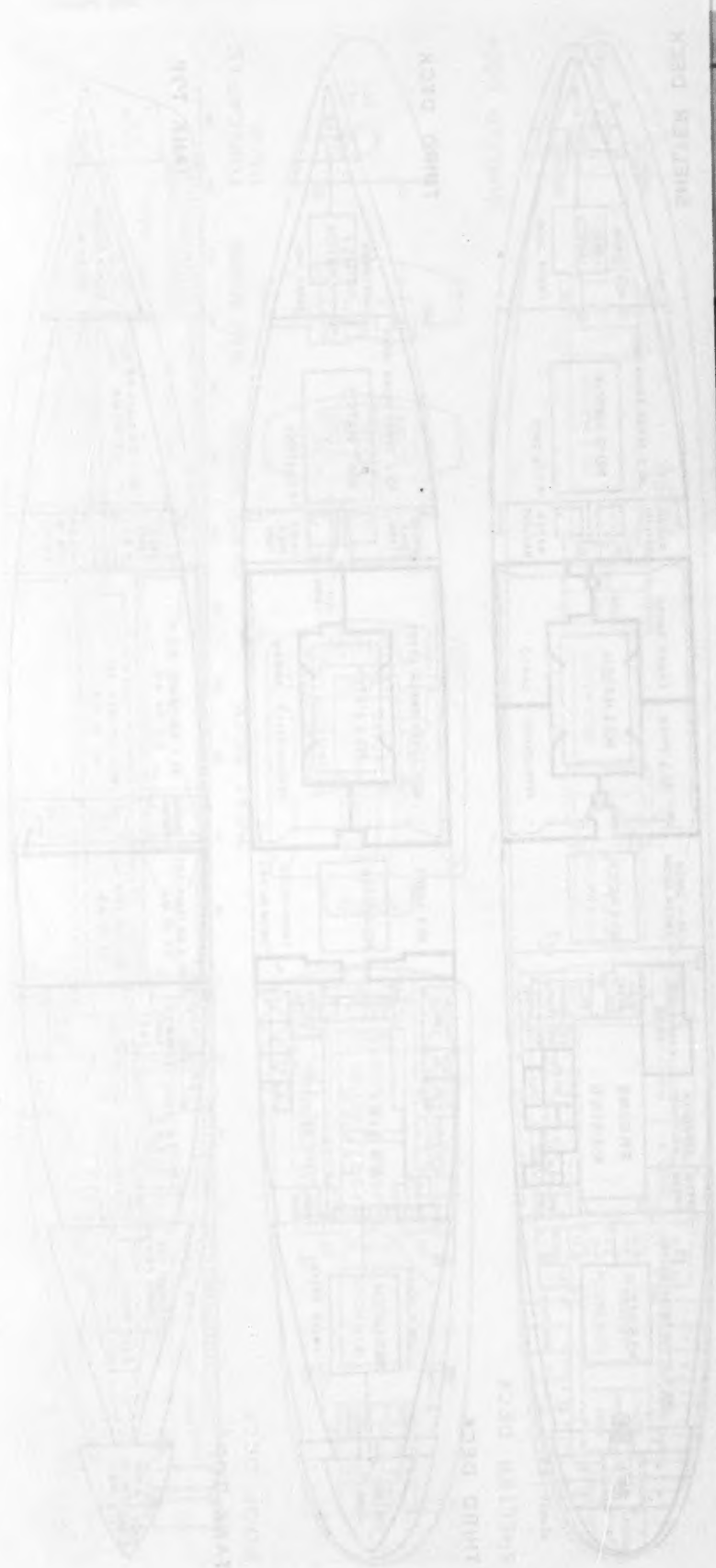
There are five holds with five cargo hatchways arranged as follows:—

Hatchway	*Shelter deck*	*Second deck*	*Third deck*
No 1	22ft 6in by 18ft	22ft 6in by 18ft	22ft 6in by 16ft
No 2	43ft 3in by 23ft	43ft 3in by 23ft	43ft 3in by 23ft
No 3	42ft 6in by 23ft	42ft 6in by 23ft	42ft 6in by 23ft
No 4	30ft by 23ft	30ft by 23ft	30ft by 23ft
No 5	32ft 6in by 23ft	32ft 6in by 23ft	32ft 6in by 23ft

Deep tanks of all-welded construction have been arranged at the after end of No 2 hold as shown on the accompanying drawing. These tanks are suitable for the carriage of water ballast, edible oil in bulk, latex and



Deck view looking aft

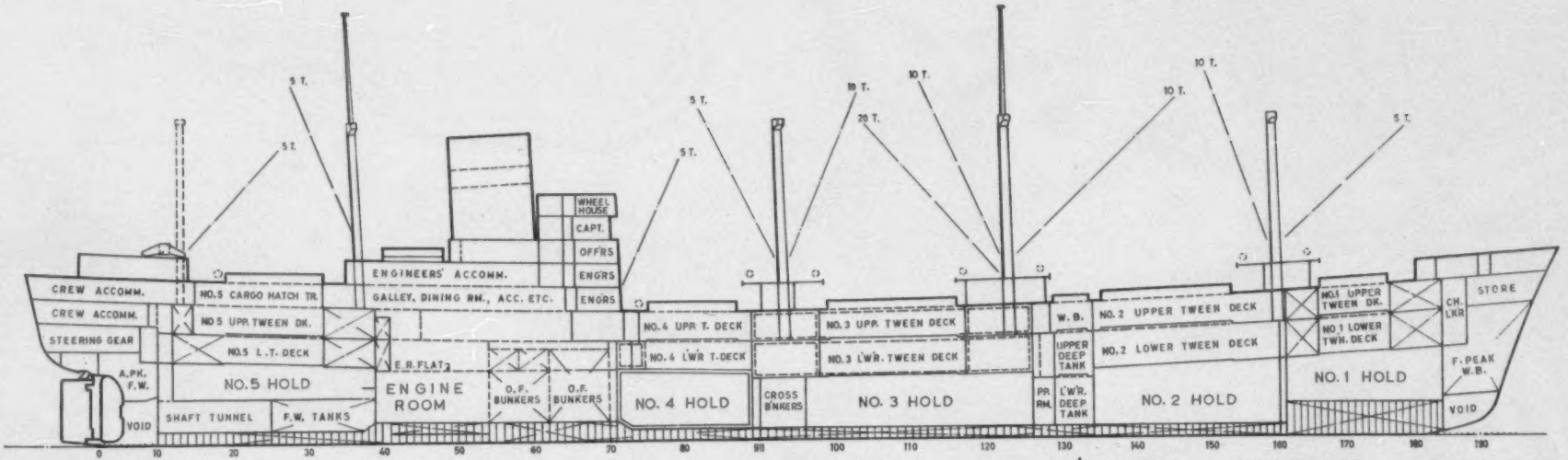


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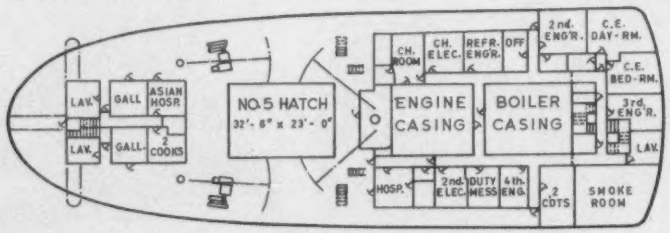
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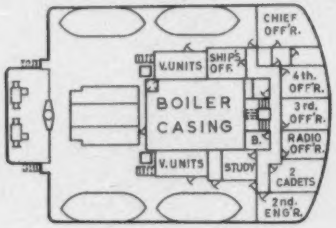
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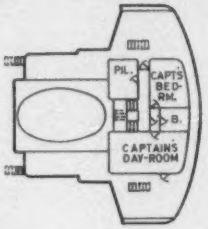
POOP DECK



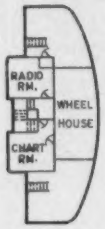
BOAT DECK



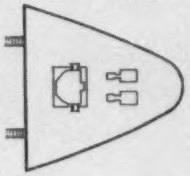
CAPT'S BRIDGE



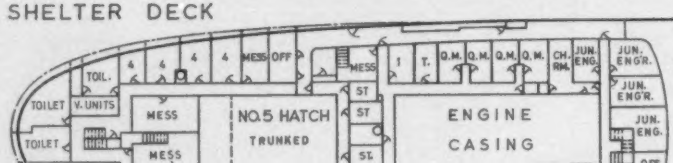
NAV. BRIDGE



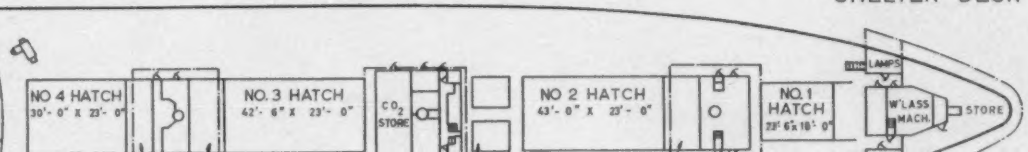
FORECASTLE DECK

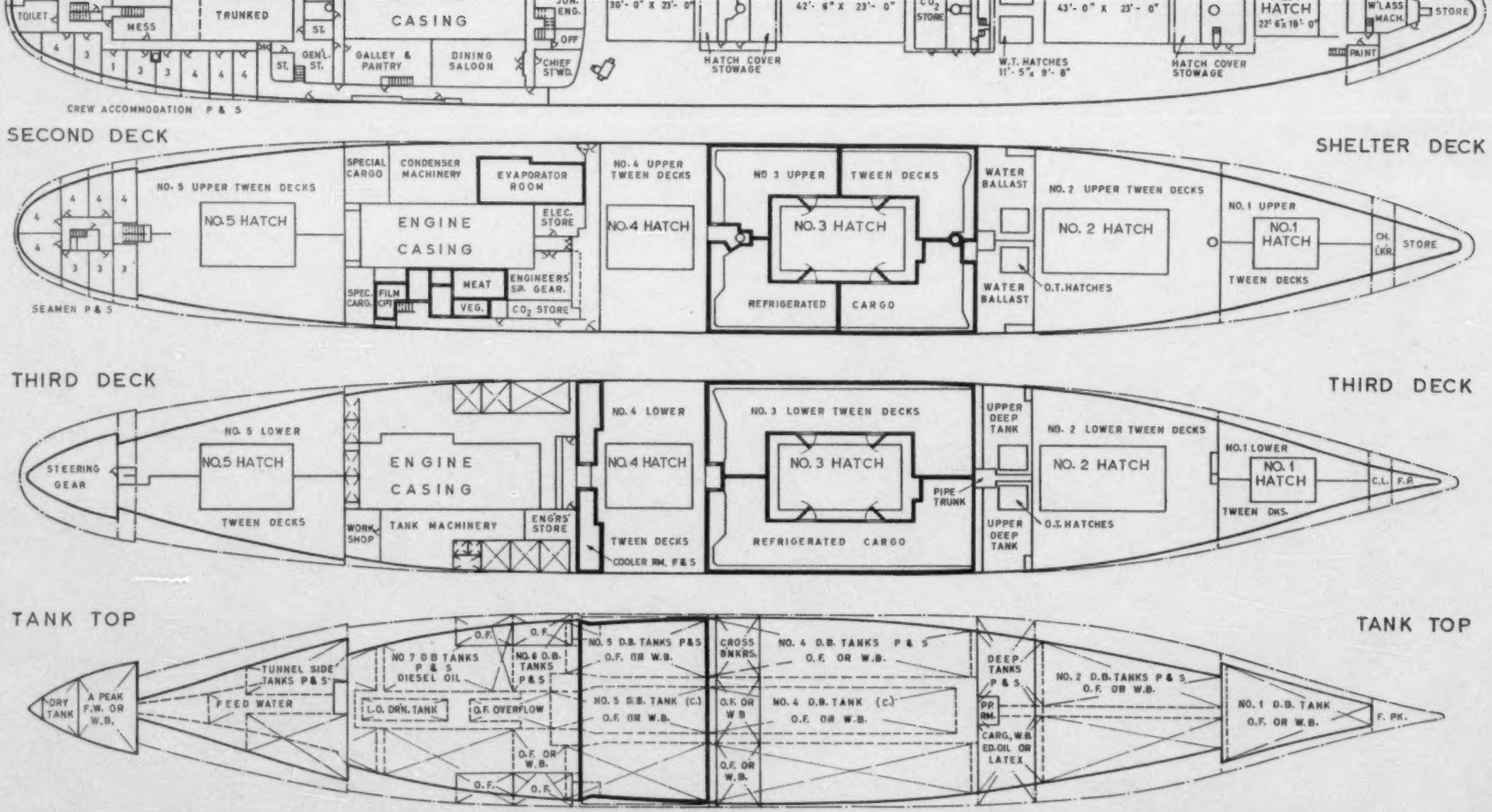


SHELTER DECK

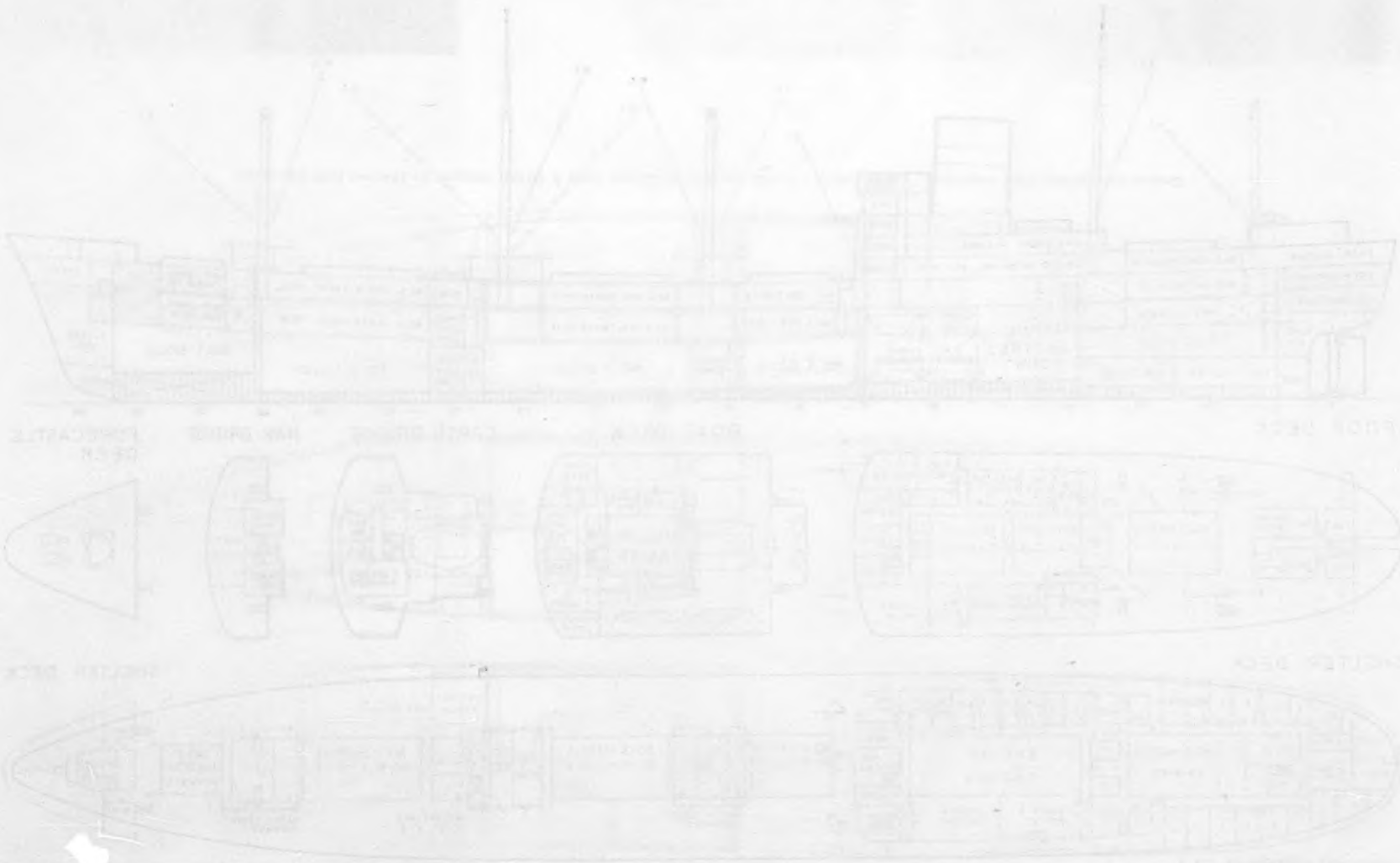


SHELTER DECK





General arrangement of the cargo liner "City of Sydney", 11,570 dwt, built by Barclay, Curle & Co Ltd, Glasgow, for Ellerman Lines Ltd, London



oil fuel, and are fitted with natural supply and exhaust ventilation so that dry cargo can also be carried. Two pipe tunnels have been fitted into the ship's structure to carry the piping in the forward part of the vessel.

The cargo hatches on the shelter deck are of MacGregor's patent single-pull type. The cargo hatch coamings on the second and third decks, with the exception of No 4 insulated hatch which has MacGregor insulated steel covers, are recessed to take portable roller hatch beams and wood covers. A special cargo locker has been arranged at the forward end of No 5 lower tweendeck.

The cargo handling equipment consists of ten 5-tons derricks, eight 10-tons derricks and one 20-tons derrick, two of the after cargo winches having geared warping ends for mooring purposes. A special electrically-operated winch has been provided for raising and lowering No 4 hold hatch cover. The 16 Autocon cargo winches and two cargo warping winches have been supplied by Clarke, Chapman & Co Ltd who also supplied the anchor windlass. The vessel has fore· main, mizzen and jigger masts as well as derrick posts. The after side of the fore, main and mizzen mast, outriggers and forward side of the jigger mast outrigger are fitted with closely spaced horizontal galvanised sheet iron angles to prevent spurious radar echoes.



The officers' smoke room on the poop deck

Refrigerated Holds

No 3 upper and lower tweendecks and No 4 hold are insulated and refrigerated for the carriage of deep freeze, frozen, chilled beef, dairy produce and fruit cargoes, No 3 upper tweendecks being available for the carriage of chilled beef. The refrigerating machinery, cooler batteries, rans, pumps etc, have been supplied and installed by J. & E. Hall Ltd, and the insulation by Cork Insulation & Asbestos Co Ltd. A thermal injection system similar to that installed in the *City of Melbourne* (*SW*, 7.9.59), has been supplied by Thermotank Ltd, and fitted by the builders at the base of the steel bulkheads to eliminate condensation round the boundaries of the insulated chambers adjacent to the cooler access spaces.

Comfortable and spacious accommodation has been provided for the officers and crew, with air conditioning for European personnel and mechanical ventilation for the remainder. The accompanying illustration of the officers' smokeroom and dining saloon will give some impression of the high standard of the accommodation. Ample store room has been provided in the upper tweendeck and on the shelter deck, all with easy access from the galley and pantry.

The European galley and pantry are situated on the starboard side of the shelter deck and are equipped with the latest type of electrically heated cooking equipment, which includes a Carron range, grill, bread prover and water boiler. The Asian galleys are on each side of the poop deck and are also provided with electrically heated ranges. Sutcliffe, Speakman & Co Ltd have supplied water treatment plant which ensures the purity of the

(*Continued on page 40*)



The officers' dining saloon on the shelter deck

Machinery in the Liner "Oriana"

DETAILS OF PROPULSION AND AUXILIARY MACHINERY INSTALLATION

THE NEW passenger liner *Oriana*, 41,923 grt, which was described in THE SHIPPING WORLD of 30 November 1960, is powered by twin sets of geared steam turbine machinery of PAMETRADA design. This vessel, built by Vickers-Armstrongs (Shipbuilders) Ltd, has a service speed of 27.5 knots, which makes her by far the fastest passenger liner yet built for Australian and Pacific service. The propelling machinery, together with the associated principal auxiliaries, is arranged in one large closed engine room located amidships. Examination of the accompanying drawings will show how carefully the layout of the machinery has been planned and how the height of the engine room has been kept to a minimum, thus allowing additional space for passenger accommodation.

The propeller shafting passes through separate tunnels leading from the engine room, forward of which is the boiler room containing four Foster Wheeler boilers arranged in twin units with a centre firing platform. Forward of the boiler room is the space housing the Denny-Brown stabiliser gear, and then forward of this is the turbo-generator room. Forward again is the refrigerating room with the turbo-driven compressors and associated refrigerating and air conditioning plant.

Special Features

Several innovations have been incorporated in the design and construction of the machinery installation which, apart from the machinery of the *Queen Mary* and *Queen Elizabeth*, comprise the largest turbine sets ever built for a British merchant vessel. The steam temperature at 960 deg F is the highest for any British merchant ship, and the turbo-generators, each of 1,750 kW, 220 volts DC, are the largest marine sets installed.

Some of the innovations, which will be described later in this article, include a new type of powermeter for determining horsepower, two-stage pumping and heating for boiler fuel, suspended-flame burners and automatic control of the viscosity of the fuel, ion exchange plant for the feed water, pass-in/pass-out generator turbines and acid cleaning of boilers, steam system, condensers and feed systems.

A noticeable feature is the location of the thrust blocks, which are positioned at a distance of about one-quarter of the length of the propeller shafting from the main turbines. This has been done in order to lift the resonant speed for axial vibration of the shafting above the running range. A resonance changer is also fitted to each thrust block. Much has yet to be learned about axial vibration and it is of interest to note that this problem has already been given high priority on the research programme of B.S.R.A., and investigations are being carried out jointly with PAMETRADA.

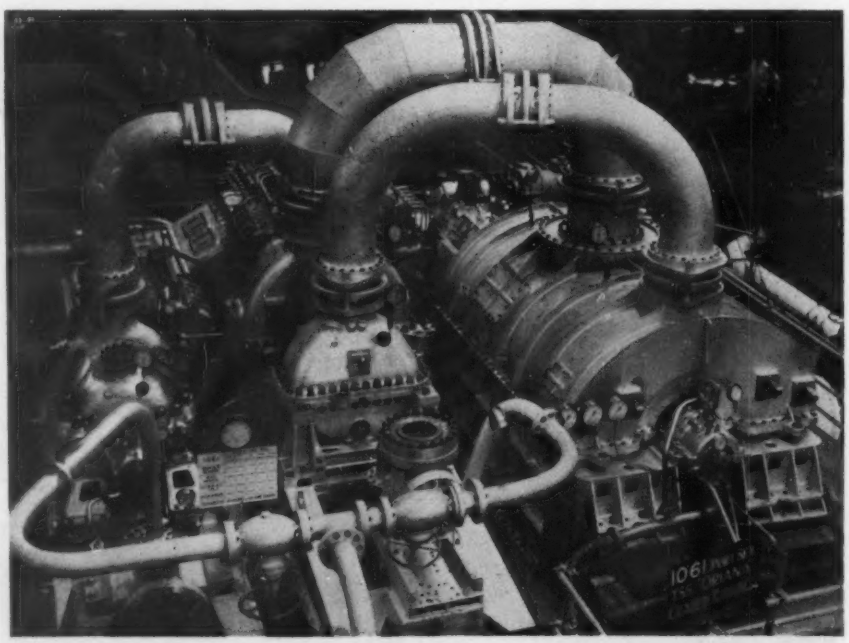
The *Oriana* is propelled by twin screws, each driven by a set of geared turbines of the mixed impulse reaction type manufactured by Vickers-Armstrongs (Engineers) Ltd to the designs of PAMETRADA. Each set of turbine machinery is designed to utilise steam at an initial pressure of 700 lb/sq in and superheated to a temperature of 950 deg F. The installation, which in normal service develops 65,000 shp at a propeller speed of 147 rpm has been designed for operation at a maximum power of 80,000 shp being developed at a propeller speed of 157.5 rpm. The power margin is ample to ensure that the vessel will maintain her voyage schedules with exactitude.

Two stages of speed reduction are incorporated in the transmission from each turbine HP, IP and LP to the main gear wheel. The astern units have been proportioned to develop 42,000 shp, i.e. 65 per cent of the normal ahead power of 65,000 shp.

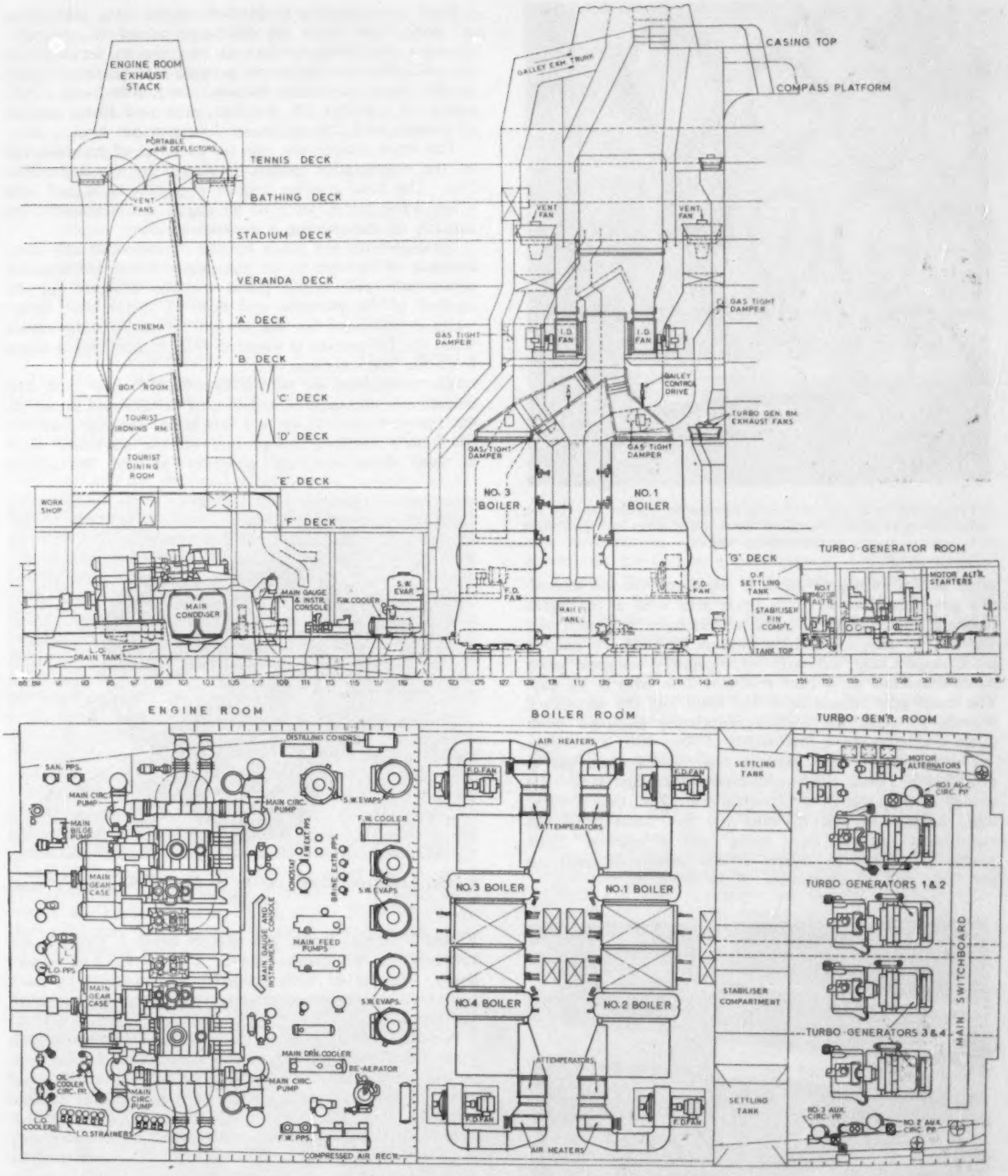
The HP turbine is of the all-impulse type consisting of one impulse wheel with two rows of blades followed by eight single-row impulse wheels machined out of the forged steel rotor. The IP turbine is of the all-impulse type consisting of nine single-row wheels also machined out of the forged steel rotor. Bled steam for feed and air heating and for the evaporating plant is taken from this turbine before either the 4th or the 7th stage depending upon the power being developed.

The LP turbine is of the double-flow mixed impulse-reaction type consisting of four single-row impulse stages followed by six reaction stages. The HP astern turbine consisting of one two-row impulse wheel is overhung at the forward end of the IP turbine. The LP astern turbine consisting of two separate impulse wheels is incorporated in the forward end of the LP turbine cylinder.

Michell thrust bearings are arranged with each turbine



Port set of geared turbine machinery on the test bed at the Barrow Works of Vickers-Armstrongs (Engineers) Ltd

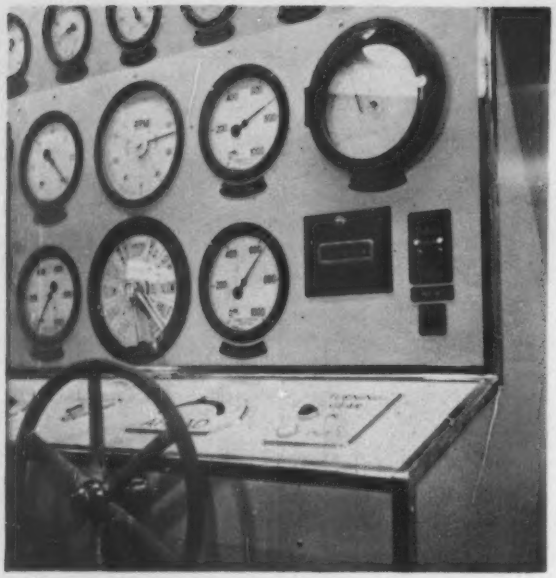


General arrangement of the propelling machinery in the 41,923-grt passenger liner "Oriana"

to carry any unbalanced axial thrust and the HP and LP turbines are fitted with Aspinall's patent emergency trip governors with fore and aft movement indicator and control. The IP turbine is fitted with the new style ring-type overspeed governor of Cockburns' design. The steam glands fitted to each turbine are of the spring backed design. The inner pockets are connected to a steam collector maintained automatically at 1 lb/sq in. The outer pockets are connected to the Weir gland steam condensers which are capable of handling all vapour from the turbines and maintaining an ample vacuum at the furthest gland pocket.

Each turbine drives the main gearwheel through double-helical articulated gears consisting of one primary pinion, one primary wheel and one secondary pinion. Each turbine drives its own primary pinion through a small toothed flexible coupling. For the HP, IP and LP turbines the primary pinions are forged from nickel-chromium-molybdenum steel (55 tons/sq in minimum).

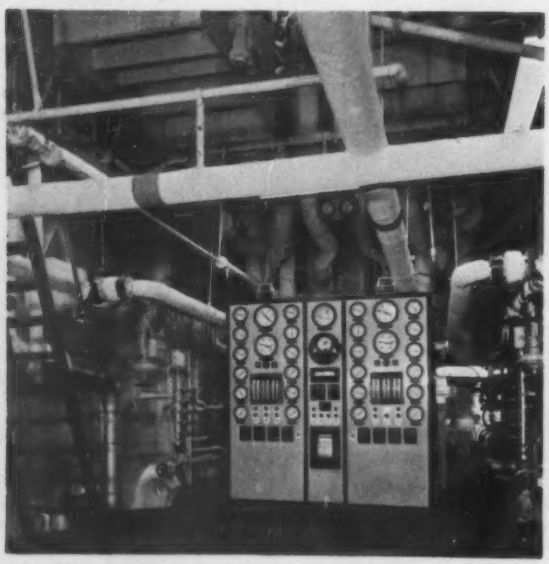
The tooth form of the primary gears is involute 6/10in



The Muirhead-Pametrada integrating powermeter can be seen in the right-hand corner of the illustration above, which shows part of the main manoeuvring console

pitch with a 16 degree pressure angle and for the secondary gears involute 8/10 in pitch also with a 16 degree pressure angle. The primary wheels have 243 teeth and the HP, IP and LP turbine pinions have 65, 74 and 91 teeth respectively, cut with appropriately designed pitch circle diameters on a face width of 29in with a 3in gap. The main gear wheels have 562 teeth and the secondary pinions 81 teeth cut with appropriately designed pitch circle diameters on a face width of 48in with a 3in gap.

Lubrication of the gearing and turbine bearings is provided by three electrically-driven two-stage tank type pumps manufactured by Drysdale & Co Ltd, two of these units being sufficient to meet the full demand of the installation and the third being held in reserve. Each pump is designed to deliver 50,000 gallons of lubricant per hour against a pressure of 55 lb/sq in.



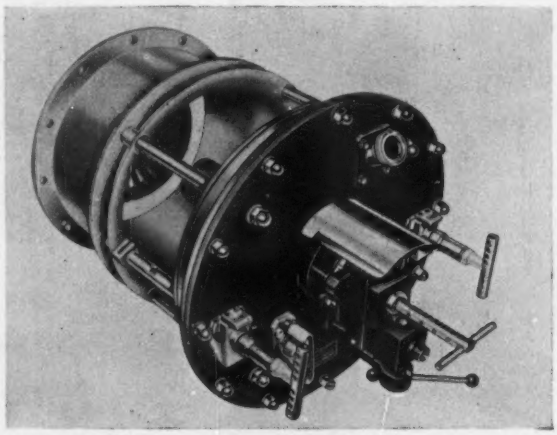
Boiler firing aisle with the Bailey automatic control board in the centre

Each pump suction is direct from the large lubricating oil drain tank while the discharge passes via magnetic strainers and Serck coolers to two gravity tanks which are of sufficient capacity to provide 6.56 minutes supply in the event of pump failure. Two Alfa-Laval lubricating oil purifiers are installed, each unit being capable of dealing with 250 gallons of lubricant per hour.

The main condensers, one for each set of turbines, are of the regenerative design developed by G. & J. Weir Ltd. The total cooling surface is 64,000 sq ft and with a sea water temperature of 86 deg F the condensers are capable of maintaining a vacuum of 28in.

Arrangements are made for the operation of any combination of turbines in an emergency. There are portable pipes, removable orifice plates specially designed for the control of the pressure and flow of steam, and spray-water connections for the control of steam temperature when the LP turbine is supplied with desuperheated steam from the main boilers.

The propellers are of the four-bladed solid type 20ft in diameter, one each of two distinct designs and materials. On the port shaft there is a left hand working propeller of Stone's Heliston design and on the starboard shaft a right hand working propeller of the Manganese



A Lucas "suspended-flame" register as fitted in the Foster Wheeler boilers

Bronze Scimitar design, the makers being J. Stone & Co Ltd and the Manganese Bronze & Brass Co Ltd respectively. (Spares of each propeller are supplied by each manufacturer of similar material and design but to opposite hand.)

A Siemens-Ford electric torsionmeter is fitted to each shaft for measuring the torque transmitted to the propellers. Since this equipment was ordered a new and direct method of measuring the shaft horsepower became available, and has been fitted. This is the Muirhead-Pametrada integrating powermeter which records over any period of time the shaft horsepower hours developed by each set of main propelling machinery. An accessory, giving the "instantaneous" power and revolutions for each shaft, is incorporated on the main manoeuvring console (see illustration above).

One complete motorised radial lubricator scheme has been installed for stern gland lubrication comprising one radial grease pump, one 20 lb capacity container and six pumping units as supplied by Tecalemit Ltd. The pump is driven through reduced gearing by a ¼-hp motor supplied by the Normand Electric Co Ltd, and the system includes the latest Wakefield Type "M" Flowmencators for grease flow observation.

The *Oriana* has four main boilers of Foster Wheeler

ESD type and design, with full air casings and to suit operation under balanced draught conditions. They are arranged as a twin unit, port and starboard, with a common firing aisle running athwartships. The air-fuel ratio, steam pressure and temperature are all automatically controlled by Bailey automatic control equipment. All four boilers have been built under licence by Vickers-Armstrongs (Engineers) Ltd.

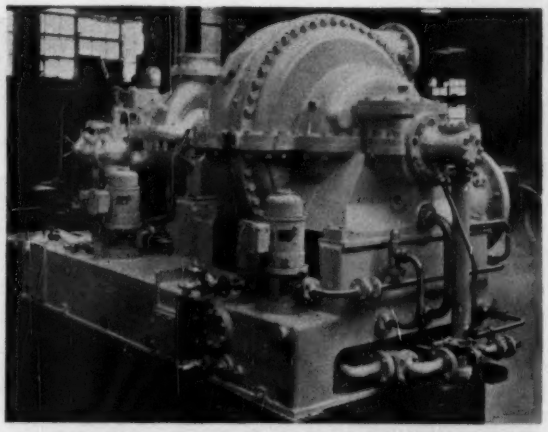
The design data for each boiler is as follows:—

Number of boilers	4
Normal evaporation	160,000 lb/hr
Maximum evaporation	200,000 lb/hr
Steam pressure	750 lb/sq in
Steam temperature	960 deg F
Feed temperature	240 deg F
Generating surface	23,675 sq ft
Economiser surface	19,920 sq ft
Superheater surface	6,080 sq ft
Fuel oil consumption	15,900 lb/hr

The Foster Wheeler superheater is arranged in three banks with intermediate steam connections to the air attemperator. The elements are of the multi-loop type with welded joints at the headers. The headers are fabricated from solid drawn tube, the inlet headers made of mild steel and the intermediate and outlet headers chrome-molybdenum steel. The first pass is designed according to the manifold system with stubs between superheater headers and manifolds and the second pass according to the multi-loop system with tube elements of chrome-molybdenum steel.

Each boiler has been fitted with eight 15-in "suspended flame" register and one 10-in "suspended flame" pilot register supplied by Joseph Lucas (Hydraulic & Combustion Equipment) Ltd, Birmingham. Combustion air is supplied at 290 deg F with a maximum draught loss across the registers of 8in WG. The fuel oil used is of a viscosity of up to 6,000 Red. secs No 1 at 100 deg F. In order to supply fuel at the burner with the required viscosity, pressure and quantity, the necessary control equipment has been arranged on each boiler such that the individual systems can either be cross fed or isolated.

Fuel is fed from the settling tanks to the system at approximately 100 deg F, heaters being arranged in the tanks to maintain this temperature. Fuel passes through Autoklean strainers to the Mirrlees boost pump which pressurises the fuel to about 35 lb/sq in. A relief valve across the pump is set at 75 lb/sq in. From the boost pump the fuel is fed through a steam cooler which raises its temperature by about 40 deg F. Prior to passing to the low pressure heater, fuel passes through a mixing chamber where the recirculating fuel from the boiler face is thoroughly mixed with the incoming fuel.

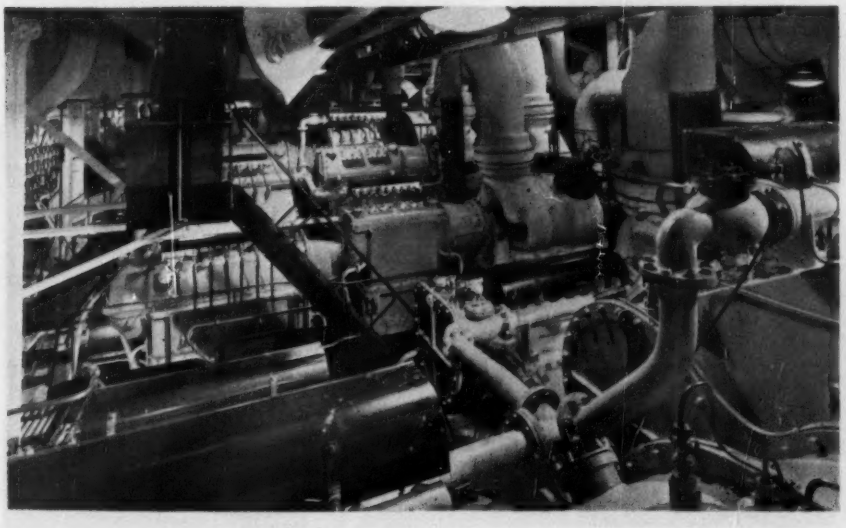


One of the A.E.I. turbo-compressors, rated at 5.5 million B.T.U./hr, for air conditioning

The first stage heater raises the fuel temperature to a maximum of 240 deg F. This is controlled by a thermostat downstream of the heater. The main pump then pressurises the fuel to a maximum of 550 lb/sq in prior to it being finally heated to a value which maintains the viscosity at the burners of 68 secs Red. No 1. The amount of steam to this final heater is controlled by a viscometer, allowing a variety of fuels to be used without any adjustments being necessary. When the fuel is at the correct viscosity it is fed to the boiler manifold where it is fed to the appropriate burners. Downstream of the manifold a Bailey meter regulating valve controls the system pressure. This is arranged to be operated automatically in conjunction with the air mass flow to cater for changes in steam demand. When all the burners are operating a boiler turndown of 1.1/3:1 can be attained automatically. For a turndown greater than this, individual burners are shut down.

The closed feed system is arranged on the well-known closed-circuit principle associated with the name of G. & J. Weir Ltd and comprises the following:—Four electrically-driven extraction pumps (two working and two in reserve) each capable of dealing with 305,000 lb/hr in normal service, the maximum overload capacity being [illegible]380,000 lb/hr. The associated electric motors have been manufactured by W. H. Allen, Sons & Co Ltd. The air-ejecting equipment is of the Maxivac steam-jet three-stage type, each of two ejectors, being capable of dealing with 84.5 lb of air associated with 143.5 lb of vapour per hour.

The closed feed control valves, which are of the direct-operated type, are bolted to the condenser shells: each consists of 5in supplementary feed valve and a 4in overflow valve, operated by a single float. Two combined gland-steam



View of main engine room showing turbines and reduction gearing



The main switchboard

and ejector condensers, each with a total surface of 120 sq ft (glands condenser 90 sq ft ejector condenser 30 sq ft) are each capable of dealing with 1,000 lb/hr of steam together with 450 lb/hr of air at 1in of vacuum. The drain cooler (of 1,200 sq ft) is capable of passing 610,000 lb of feed water/hr.

Two high pressure feed heaters are arranged as follows: No 1 HP feed water heater with a surface of 1,800 sq ft capable of passing 610,000 lb of feed water/hr (4 passes) and condensing 24,000 lb/hr of steam from the evaporators. No. 2 HP feed water heater with a surface of 2,600 sq ft capable of passing 610,000 lb of feed water/hr (4 passes) and condensing 47,000 lb/hr of steam and fitted with a float-operated drain valve.

The main feed pumps, of which there are two, are turbine-driven units each designed to deal with 610,000 to 795,000 lb/hr against a pressure of 1,050 lb/hr at a steam consumption of 23,500 to 27,200 lb/hr at a pressure of 750 lb/sq in and temperature 960 deg F.

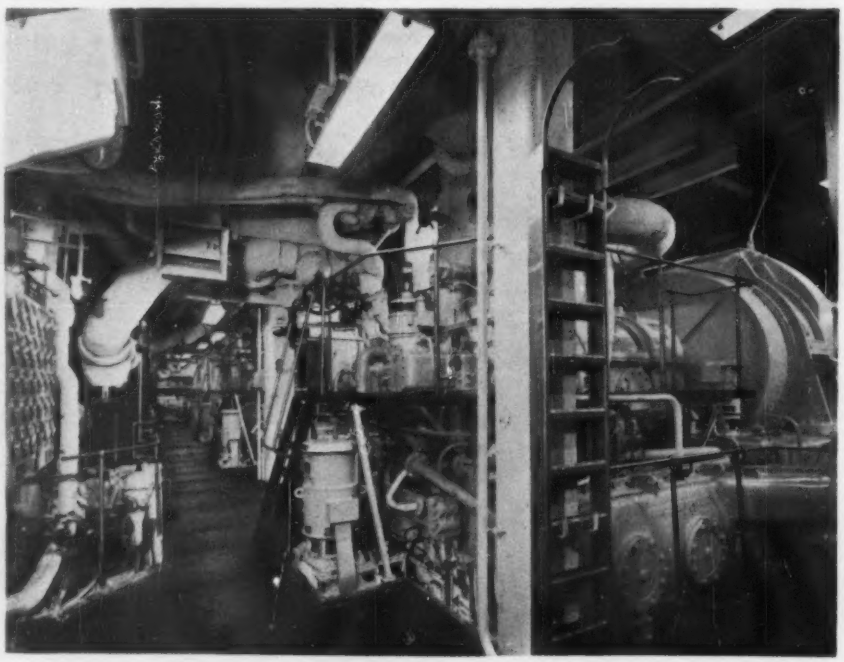
The Weir harbour duty feed pump, also turbine-driven, is capable of dealing with 100,000 to 130,000 lb/hr against a pressure head of 950 lb/sq in. There is, in addition, a motor-driven harbour service three-throw pump capable of delivering 20,000 lb/hr against a discharge pressure of 1,100 lb/sq in. With the exception of the turbo-driven feed pumps the auxiliary machinery associated with the propelling installation is electrically-operated. All the make-up and certain drains pass through an ion exchange plant designed and supplied by the County Water Softener Co Ltd.

The complete distilling plant is designed for a total capacity production of 650 tons of fresh water per day of 24 hours when supplied with 34,200 lb/hr of low pressure bled steam at 25 lb/sq in and consists of six vertical evaporators of identical construction arranged to operate as three groups of two evaporators working in double effect.

Electrical power is supplied by four 1,750 kW, 220-volts DC turbo-driven generators, manufactured by W. H. Allen Sons & Co Ltd, three normally running with one standby arranged abreast, port to starboard, in the generator room forward of the stabiliser compartment. The turbo-generators are arranged to feed into a main switchboard 65ft in length, from which control of the whole installation is effected.

Each generator of 1,750 kW normal rating, plus 10 per cent overload capacity for two hours, has a multi-stage high efficiency pass-out condensing steam turbine also capable of passing in exhaust steam from the turbo-compressors. Each turbine is designed for normal output when passing out up to 18,500 lb. of steam/hr at 65 lb/sq in and exhausting to 28.5in vacuum (bar. 30in) with cooling water at 75 deg F, and also capable of passing in up to 18,500 lb of steam/hr at 65 lb/sq in. The condensers each rated at 17,700 lb/hr corresponding to an output of 1,750 kW (no pass-out or pass-in) are designed to maintain 28.5in vacuum under these conditions.

Each turbine is arranged to drive through Allen-Stoeckicht epicyclic gearing an Allen 220-volts DC marine type enclosed air/water cooled generator having Class B insulation, and is complete with full automatic nozzle control, forced lubrication system including main and auxiliary oil pumps, speed control and emergency governors interlinked with pass-out governor gear designed to maintain a constant pressure at the pass-out branch irrespective of changes of load or demands for process steam, the governor also being developed to meet the pass-in control requirements.



The main generator room

Molasses by Tanker

A FURTHER UNUSUAL CARGO FOR THE "CHARLTON VENUS"

By J. H. Clarke, M.I.Mar.E.*

DUE TO a persistent depression in the shipping industry, with few cargo movements and correspondingly low freight rates, shipowners were being faced with the problem of either obtaining cargoes to suit their ships; or adapting them to carry cargoes which were available and could show slight profits, or at least break even.

To convert a ship from one type to another can be a very expensive process, depending on the amount of conversion required. However, if an adaptation can be made to a ship without changing its basic functions, which will enable a variety of cargoes (other than those for which it was originally designed) to be carried; and furthermore enable the vessel to revert to its prime characteristics without undue delay and expense, then the shipowner is in a position to explore and develop markets from which he would otherwise be debarred.

As the author had been responsible for the innovation and development of the carriage of other unusual cargoes in the company's ships, he was requested by the directors of Chandris (London) Ltd, managing agents for the Charlton Steam Shipping Co. Ltd, to ensure that the *Charlton Venus*, a 16,700-dwt tanker built by Wm. Doxford & Sons Ltd, Sunderland, in 1951, would be suitable to carry a full cargo of blackstrap molasses from Formosa to Houston, Texas. On confirmation being given, the vessel was subsequently chartered out on the American market as per I.M.O.L. Charter Party (American Form Molasses Charter Party) to load a minimum of 15,700 long tons of blackstrap molasses at one or two safe berths in Formosa (at charterer's option) and to discharge at one safe port U.S.A. including Baton Rouge (at charterer's option).

Previously the vessel had not been equipped with cargo tank heating coils, as prior cargoes had consisted of a variety of light petroleum products (1), wine and grain (2), which did not require external heating for their carriage. As a long term policy the owners had delivered a complete set of aluminium brass heating coils to the ship, these being stored in the forward cargo hold until required. Before proceeding to the loading port at Formosa for the molasses cargo, the vessel had discharged a cargo of grain at Nakhodka, U.S.S.R. Subsequently *en route* from Nakhodka to Formosa arrangements were made with the (3) Sasebo Ship Industries Co Ltd, Sasebo, Japan, for the vessel to enter their yard for drydocking, annual surveys and the installation of the cargo tank heating coils. This work was completed on schedule enabling the ship to arrive at the loading port within the charter party lay days.

For the carriage of previous cargoes the Nos 1 to 9 centre and the No 9 port and starboard wing tanks had been treated with British Paints Epilux 4, an epoxy resin paint which greatly expedited the cleaning of the tanks in readiness for the molasses cargo. Whereas the treated tanks only required a light hosing down with clean salt water, the wing tanks required the manual removal of a quantity of loose rust and scale prior to washing down.

Due to the density of the molasses (SG 1.4) it was decided to carry cargo in Nos 1 to 9 centre tanks and Nos 3 and 9 port and starboard wing tanks, the remaining wing tanks being used for the carriage of water ballast.

Cleaning and preparing the cargo tanks for the reception of the cargo was carried out by the ship's personnel and as no ballast was carried in these tanks they were dry and ready for the loading of cargo on arrival at Formosa.

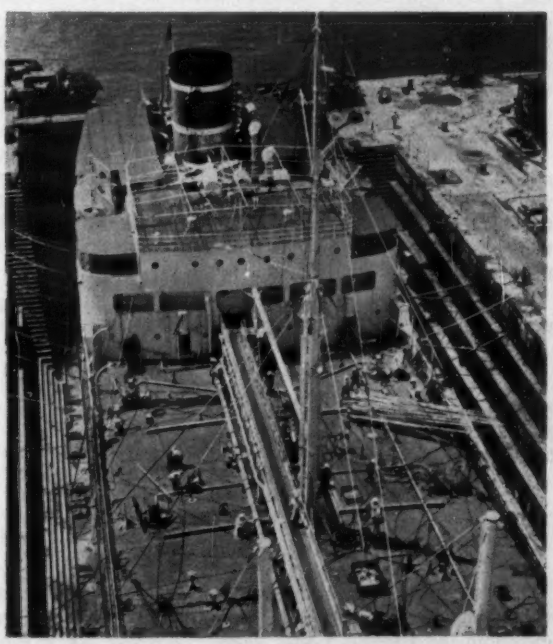
The installation consisted of 20,996ft of 1½in bore aluminium brass piping giving a heating surface of 1 sq ft per 80 cu ft of cargo tank capacity. At 87 deg F, SG 1.455 cargo stowage equalled 24.71 cu ft/long ton.

These heating coils were supplied by Charlton Weddle & Co Ltd, and by virtue of the material proved a lightweight installation together with anti-corrosive properties and good heat transference.

Owing to severe southerly gales being encountered *en route* from Sasebo the vessel took 3 days instead of the customary 2½ days. She arrived outside the breakwater where the usual pratique, customs and immigration formalities took place, then proceeded alongside the loading berth 2½ hours after arrival. Notice of readiness was tendered and accepted. The charterer's and shippers' inspectors examined the cargo tanks and expressed complete satisfaction as to their condition. The ballast was discharged. The cargo pumproom sea valves were closed and sealed by the inspectors, to ensure no possibility of any unauthorised person opening them thus causing the possible contamination of the cargo by sea water.

Loading the Molasses

Loading of cargo was carried out by placing four 10in flexible hoses connected to the shore pumps through the cargo tank hatch openings. The loading temperature of



Installing heating coils in the cargo tanks of the "Charlton Venus" prior to loading with molasses

* Mr J. H. Clarke is marine superintendent engineer for Chandris (London) Ltd.

(1), (2) Refer THE SHIPPING WORLD, 19 November 1958, 28 October 1959.
(3) Refer THE SHIPPING WORLD, 1 June 1960.



Part of No 8 centre tank 13 months after application of Epilux 4

the molasses was 87 deg F, atmospheric temperature 90 deg F, a total of 15,729 long tons of cargo being taken on board. Loading was continuous for 31 hours then the vessel moved to a second berth to complete. The full loading period from arrival in port to sailing was 2 days 14 hours.

The organisation at the port of Kao-Hsiung, Chiang, Formosa, is very efficient and compares favourably with any other port in the East. Tugs, pilots and berthing facilities are good; ship and cargo movements are carried out smoothly and in a businesslike manner. The ship's personnel found the port officials courteous and extremely cooperative.

No political inquiries or delays of any description were experienced; prior to the ship's arrival in Formosa a description of the vessel together with photographs were sent to the authorities as requested. The complement of the vessel, which was registered under the British flag, consisted of 14 British officers and 49 Indian crew, there being no Chinese crew members on board.

While the cargo was being loaded into the various tanks which were filled to approximately 98 per cent full, a layer of aerated molasses about 6in thick formed on the top of the cargo. This made the accurate calibration of the tank ullages difficult, and this layer stayed inert throughout the voyage until the actual time of discharge.

Heating the Molasses

Instructions given to the master by the shippers with regard to the heating of the molasses were that heating was to begin approximately three days before arrival at the discharging port, heating to be gradual and the cargo temperature to be raised to 105 deg F for discharge purposes.

Cargo distribution	*Tank No.*	*Port*	*Centre*	*Starboard*
Draught— fwd: 30ft 3in ..	1	—	1,324	—
aft: 30ft 3in ..	2	—	1,381	—
mean: 30ft 3in ..	3	999	1,306	974
Departure	4	—	1,483	—
Stowage 24.71 cu ft/ton ..	5	—	1,429	—
SG = 1.455 at 87 deg F. ..	6	—	1,416	—
Sea temp: 67 deg to 86 deg F.	7	—	1,456	—
—	8	—	1,472	—
	9	568	1,341	580
Total long tons =		1,567	12,608	1,554
Grand total =		15,729 tons		

The voyage from Formosa to Houston by the Great Circle track totalled 35 days, a distance of 10,557 miles including the Panama Canal transit. Average speed was 12.93 knots. According to instructions, cargo heating was started three days before arrival and a temperature of 105 deg F was maintained during discharge. Sea temperatures varied from 67 deg F at Formosa to 86 deg F on arrival at Panama.

The vessel proceeded to a discharging berth on the side of the Houston Ship Canal, discharging to shore tanks by means of the vessel's steam-driven horizontal duplex cargo pumps. From experience it has been found most satisfactory to discharge completely one cargo tank while a steady temperature is maintained; the pump speeds being regulated as the tank is emptied. This prevents cavitation of the molasses in way of the tank suction valves and also prevents the pumps from becoming gas locked. A steam hose lowered to the bottom of the tank with live steam played on the liquid when draining has proved beneficial. In some cases it is of advantage to use one tank as a drain tank which afterwards can be reheated and finally discharged ashore.

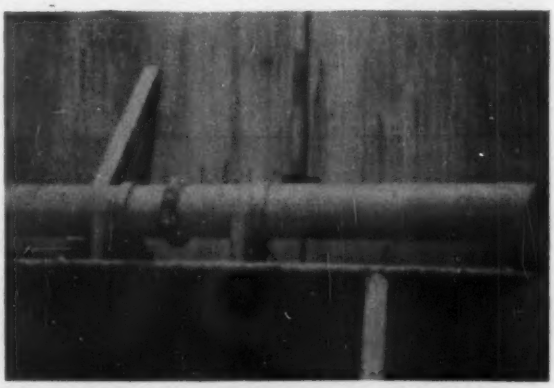
It is essential that the temperature of the molasses should not be allowed to fall below 100 deg F as at this temperature the cargo is so viscous that it will not gravitate. Care must likewise be taken to ensure that the cargo does not become scorched or overheated. The condition of the cargo was good, and there was no damage or deterioration. On completion of discharge each section of cargo piping was blown through with compressed air and isolated. The total time from arrival to completion of discharge and departure from the berth was 5½ days.

On completion of discharge at Houston the master was instructed to prepare the vessel for the carriage of grain. The tanks were washed by the Butterworth system, steamed and cleaned. Here again the Epilux-treated tanks proved an easier proposition than the bare tanks, where much more cleaning was required. Before the cleaning operation was completed the vessel's orders were changed, the master being ordered to proceed to Cuba to load a further cargo of molasses for the U.S.A. On the voyage from Houston, Texas, U.S.A. to Tarafa, Cuba, the steaming time was 3¼ days, the distance 1,084 miles and the average speed 14.47 knots.

Loading Blackstrap Molasses in Cuba

On arrival at the first loading port the vessel was deballasted and inspected by the charterers and shippers' inspectors, and subsequently found to be in good order. Notice of readiness was tendered and accepted.

The cargo was loaded through the cargo tank hatch openings in the same way as the previous cargo. At Tarafa 5,496 long tons were loaded after which the vessel moved to the ports of Bufadero where 7,054 long tons were loaded, then finally to Pastelillo (Nuevitas) where a further 3,753 long tons were shipped, making a total cargo of 16,303 long tons, reputed to be the largest



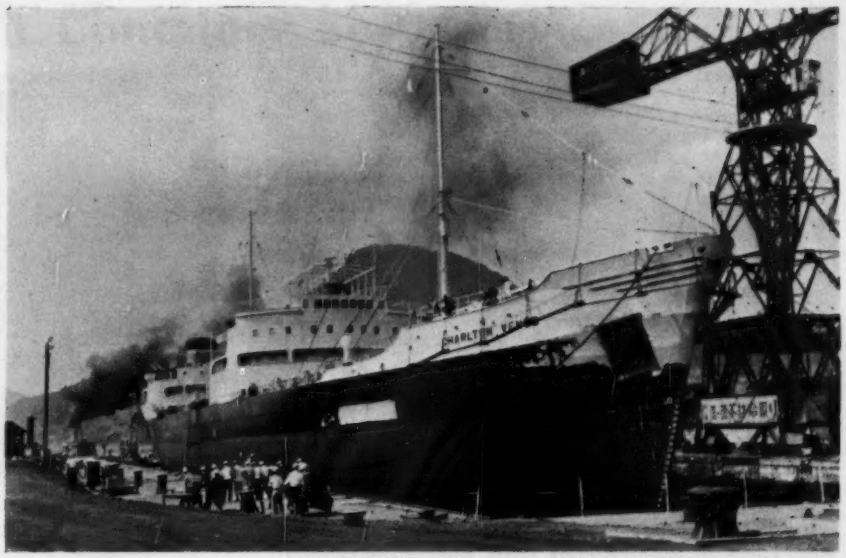
Photograph taken in No 3 centre tank 13 months after application of Epilux 4

cargo of molasses shipped from this port.

As previously the temperature of the cargo was maintained at 105 deg F.

The passage from Pastelillo (Nuevitas) to Cuba to Mississippi took 2¾ days, the distance was 830 miles, and the average speed 12.55 knots. Time taken for passage from the Mississippi pilot to New Orleans 8 hours. Time taken for discharge at New Orleans 6½ days. This was one of the largest cargoes of molasses discharged at New Orleans.

(*Continued on next page*)



The "Charlton Venus" leaving dry dock at Sasebo to load molasses at Formosa

FIRST MOLASSES CARGO

Loading: Kaohsiung, Formosa.
Discharge: Houston, Texas, U.S.A.
Loading time: 2 days 14 hours.
Discharging time: 5 days 12 hours.
Cargo carried: Blackstrap molasses SG1.455 at 87 deg F. = 15,729 long tons.
Time on voyage: (including canal transit): 35 days.
Total distance : 10,557 miles.

Approximate Cost of Disbursements at Kao-Hsiung, Formosa:

	New Taiwan dollars	
Transportation for clearance	1,000.00	
Telegrams	2,190.60	
Postage	306.60	
Special entry permit	612.50	
Pilotage	5,292.30	
Towage	2,665.60	
Wharfage	5,395.60	
Mooring and unmooring charges	400.00	
Tonnage dues	12,873.90	
Quarantine fees	360.00	
Consular fees	171.00	
Customs work permits	1,200.00	
Taxis	45.00	
Visa of crew list	74.00	
Chinese flag	70.70	
Photographs of ship	945.00	
Stamp tax	6.00	
Medical charge	387.00	
Total	N.T.$ 33,995.10 =	£336.10.4
Rate of exchange: N.T.$ 101.02 = £1.		
Agency fee		115. 0.0
Inspector of cargo tanks		12.10.0

Panama Canal dues:

Pilotage and towage, etc.	U.S. $ 667.00 =	£238. 4.3
Canal tolls	U.S. $ 7,268.00 =	2,595.17.2
Rate of exchange: U.S. $ 2.80 = £1.		£2,834. 1.5

Approximate Disbursements, Houston, Texas, U.S.A. :

U.S. Customs, entry, clearance, etc.	U.S. $215.00	
Immigration	67.00	
Public health	41.00	
Quarantine	31.00	
Pilotage	289.50	
Towage	928.00	
Mooring, unmooring, etc.	50.00	
Telegrams, post, telephones, etc.	40.00	
Taxis	10.00	
	U.S. $1,671.50 =	£596.19.3
Agency fees	U.S. $ 150.50 =	53.11.6
Total	U.S. $ 1,821.50 =	£650.10.9

SECOND MOLASSES CARGO

Loading: Tarafa, Bufader,o Pastelillo (Nuevitas), Cuba.
Discharge: New Orleans, Louisiana, U.S.A.
Loading time (total): 4 days 6 hours.
Discharging time: 6 days 12 hours.
Cargo carried: Blackstrap molasses SG 1.397 at 88 deg. F. = 16,303 long tons.
Time on voyage: 2¾ days + Mississippi transit 11 hours = 3 days 5 hours.
Total distance: 830 miles.

Approximate Disbursements, Nuevitas, Cuba:

Tonnage dues	U.S. $ 82.53	
Pilotage dues	854.00	
Customs house fees	65.00	
Port captain fees	10.00	
Boat services	114.00	
Taxi services	65.00	
Cuban stamps	13.20	
Water	165.00	
Radio telephone pilot	6.00	
Agriculture delegate fees	15.00	
Agency fees	100.00	
Total	U.S. $ 1,489.73 =	£532.0.11
Rate of exchange: U.S. $2.80 = £1.		

Approximate Disbursements, New Orleans, U.S.A.:

Pilotage	U.S. $ 503.33	
U.S. Customs	700.78	
Board of Trade report	12.00	
Harbour dues	15.00	
Launch hire	8.80	
Immigration	26.56	
Public health services	20.28	
British Consul papers	2.25	
New Orelans Steamship Assn.	11.38	
Tugs	435.00	
Water lines and fresh water	116.75	
Radio and telephone calls	82.90	
Taxis	20.00	
Visas	10.00	
Postage, etc.	15.00	
Agency fees	150.00	
Total	U.S. $ 2,130.00 =	£760.14.6
Rate of exchange: U.S. $ 2.80 = £1.		

Cargo distribution	*Tank No.*	*Port*	*Centre*	*Starboard*
Draught— fwd: 29ft 10in	1	—	1,468	—
aft: 29ft 11in	2	—	1,445	—
mean: 29ft 10½in	3	1,230	1,447	1,214
	4	—	1,445	—
Departure	5	—	1,445	—
Stowage: 25.074 cu ft/ton ..	6	—	1,439	—
SG = 1.397 at 88 deg F. ..	7	—	1,439	—
Av. sea temp: 86 deg F. ..	8	—	1,455	—
	9	789	696	791
Total long tons =		2,019	12,279	2,005
Grand total =		16,303 tons		

Total loading time in Cuba:

Time in Tarafa from arrival to sailing = 2 days. Cargo 5,496 tons
Time in Bufadero from arrival to sailing = 1¼ „ Cargo 7,054 tons
Time in Pastelillo from arrival to sailing = 1 day. Cargo 3,753 tons
Total time ... 4¼ days. Cargo 16,303 tons

Cargo Pumps

Experience has shown that the carriage of these two molasses cargoes has caused considerable damage to the cargo pump liquid-end buckets, liners, suction and delivery valves. It is considered advisable if a conventional tanker were to be employed in the carriage of molasses for an extended period specially designed pumps should be installed for this purpose.

If a vessel has been carrying molasses and is to revert to normal benzine or black oil cargoes, the cargo pumps should be opened out for full inspection and the necessary replacements made; otherwise the shipowners may find the discharge rate of subsequent cargoes will suffer with the usual financial penalties inflicted by the cargo interests.

From the author's observation the carriage of molasses is considered a good safe and stable cargo. If the vessel is well maintained and good personnel are on board no major problems should be encountered. It is recommended that a full heating coil test should be made together with the testing of the cargo pipelines prior to the loading of any molasses cargo.

I.M.O.L. (American form Molasses) charter party Usual Conditions:—

The cargo is pumped into the vessel by charterers, and cargo is pumped out by the vessel, only as far as the vessel's permanent hose connections where delivery shall be taken by the charterer or his consignee. If no fires are allowed on board the vessel the charterer is obliged to supply at his own expense steam for the discharge of the cargo only. The vessel is responsible for the cleaning of the tanks, pumps and pipelines to the reasonable satisfaction of the charter's inspector for the carriage of blackstrap molasses.

Acknowledgment

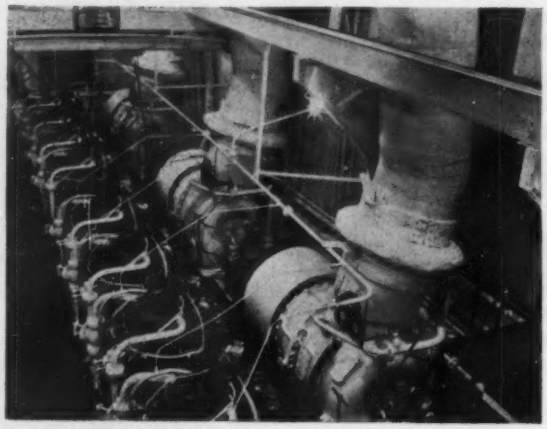
Acknowledgment for assistance rendered in the preparation of the ship and the compiling of this paper is given to Captain R. D. Purvis and the crew of the *Charlton Venus*.

HUNGARY'S foreign trade company Nikex has signed a contract to supply the Egyptian Seafaring Company with three 1,400-tons cargo vessels. All three ships, to be built at the Gheorghiu Dej Shipyards, in Budapest, will be delivered next year.

WITH the introduction of a train-ferry service across the Kertch Straits the haul between the Caucasus and the Crimea has been substantially reduced. The service is run by three small diesel-electric ferries, the *Severny*, *Yuzhny* and *Vostochny*, each capable of taking two sets of three wagons.

THE "CITY OF SYDNEY"

(*Continued from page 31*)



Top of main engine showing cylinder heads and the three Sulzer RT67 turbochargers

drinking water. This equipment includes Wallace & Tiernan plant which applies a sterilising agent to the water.

Navigational aids include Marconi Mk IV radar, Arma-Brown gyro compass, echo sounder, Lodestone D/F and SAL log. Fibreglass lifeboats have been supplied by Watercraft Ltd. A system of Toxion anti-fouling and corrosion prevention has been installed.

Propelling Machinery

The machinery in the *City of Sydney* consists of a Barclay Curle-Sulzer type 9RD 76/155 single-acting turbocharged two-stroke diesel engine which, as stated, is the first to be built since the builders recently took out a Sulzer licence. This engine has nine cylinders of 760mm bore with a stroke of 1,550mm and is capable of developing a total maximum service power of 10,400 bhp at about 115 rpm with an mep of 94 lb/sq in. Heavy fuel having a maximum viscosity of 3,500 seconds Redwood No 1 at 100 deg F can be burned in this engine and suitable purifying equipment has been installed.

Turbocharging is by means of three Sulzer type RT67 turbo blowers. Each cylinder has its own fuel pump and these, together with the fuel pumps, have been manufactured by Wilson & Kyle Ltd. The cylinders are lubricated by Shell Alexia oil 40, which is delivered by means of Bosch mechanical lubricators. Shell Talpa oil 30 is used for the main engine crankcase, auxiliary diesels and air compressors.

Electricity for power and lighting is supplied by four direct-coupled diesel engine-driven generators, each having a continuous output of 320 kW with a voltage of 220 DC at 333 rpm. The complete sets, engines and generators, have been supplied by W. H. Allen, Sons & Co Ltd. The main switchboard is of the Campbell & Isherwood dead front type. Steam for fuel heating and domestic purposes is supplied at 100 lb/sq in pressure by two Spanner oil-fired boilers and one Spanner exhaust gas boiler. The oil-fired boilers are 7ft 3in diameter and 12ft 9in high, each capable of producing 4,500 lb of steam per hour. The exhaust gas boiler is 7ft diameter and 10ft 6in between flanges and is capable of producing 4,900 lb per hour with the main engine exhaust at maximum service power.

"Caposite" amosite asbestos insulation has been fitted on piping and exhaust gas manifolds in the engine room; and "Rocksil" rock wool special density slabs on the engineroom casings. Both these materials are manufactured by the Cape Asbestos Co Ltd.

British Container Ship Services

IN THE PAST year or so a good deal of publicity has been given to developments in container ship services in the United States, where the great distances involved even for coastal voyages make it desirable to have large ships specially designed for the carriage of containers. These developments are important, and are pointing the way to similar changes on other oceangoing routes, but they should not be allowed to obscure the fact that container traffic on the short-sea routes linking the British Isles with adjacent countries is now well developed.

Details are given here of the various services maintained on these routes by British ships designed for the carriage of containers. Not all of these ships are designed exclusively for this type of cargo; but although a composite ship must inevitably lose some of the advantages of quick turnround which are being sought in the United States, they may well be a necessary preliminary to the all-container ship on some routes.

Anglo-Continental Container Services
Services: Preston–Larne (daily); Ardrossan–Larne (daily).
Ships: *Clipper, Goodwill, Prior, Stream Fisher, Elisa.*

Associated Humber Lines
Services: Hull–Rotterdam–Antwerp–Ghent; Goole–Bremen–Copenhagen–Hamburg–Rotterdam–Amsterdam–Antwerp–Dunkirk.
Ships: *Wakefield, York.*

Atlantic S.N. Company
Services: Tilbury–Antwerp (twice weekly); Tilbury–Rotterdam (weekly); Preston–Larne (daily); Preston–Belfast (weekly).
Ships: *Bardic Ferry, Ionic Ferry, Empire Celtic, Empire Cymric, Empire Nordic, Cedric Ferry* (building), *Doric Ferry* (building). (Basically transport ferries, these ships also carry containers.)

British Transport Commission
Services: Harwich–Antwerp (three times weekly); Harwich–Rotterdam (three times weekly).
Ships: *Isle of Ely, Colchester.*

James Fisher & Sons
Services: Felixstowe–Rotterdam.
Ships: *River Fisher.*

Link Line
Services: Liverpool–Belfast (nightly).
Ships: *Pointer, Spaniel.*

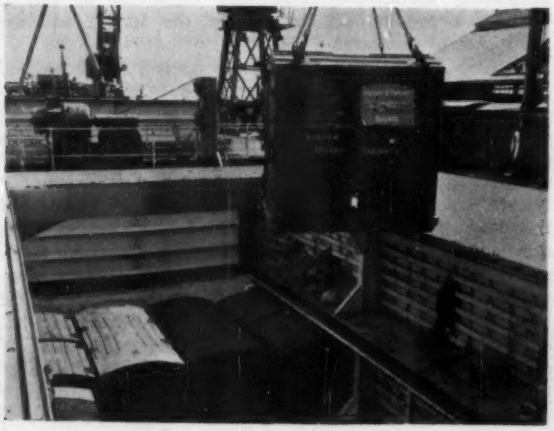


British short-sea container ship services





RIGHT: The vessel "Goodwill" is one of the container ships employed by Anglo-Continental Container Services
BELOW RIGHT: The "Bardic Ferry" is now engaged in her owners' Tilbury-Antwerp Service
BELOW LEFT: Loading containers into the British Transport container ship "Colchester"



Freight Markets in 1960

DIFFICULT CONDITIONS THROUGHOUT THE YEAR

By BALTRADER

ONCE AGAIN shipowners experienced a difficult twelve months trading, with the supply of tonnage usually in excess of demand, and yet in many ways 1960 was a year of progress. The huge pool of laid-up ships which had hung over the freight markets like a dark cloud for so long at last showed positive signs of dispersing, and of those vessels which remained out of commission few were likely to be fit for anything better than the scrap-yard. Most of the Liberty and other warbuilt ships which came out of lay-up in the winter of 1959-60 managed to keep trading throughout the quiet summer months which followed, and it was an encouraging feature of the markets last year that they were able to absorb this considerable influx of old warriors without too disastrous an effect on rates of freight.

After so many years of depressed markets it is not surprising that the flow of new ships from the yards should have fallen off sharply, but many newbuildings which had been ordered in happier times were delivered to their owners in 1960 and secured business without creating too much obvious unemployment among their less modern competitors. In fact, the general level of freight rates last year, though at times too low to allow any but the finest ships to show a profit, was nevertheless usually higher than it had been for several years and most owners saw 1960 out in a mood of cautious optimism.

Tankers in Grain Trade

Once again, as in previous years, oil tankers made heavy inroads into the preserves of dry-cargo shipowners, and these vessels carried huge quantities of grain throughout the year, particularly in such trades as from the U.S. Gulf to the near Continent, where the port facilities were well able to handle tankers of all sizes up to as much as 30-40,000 tons capacity. This is not to suggest that tankers confined their operations entirely to the main routes, however, and in 1960 it was quite common for handy size tankers to load grain cargoes on markets such as the River Plate and Great Lakes, areas which one tends to associate with restricted draughts and limited sizes. Towards the end of the year the oil tanker market began to pick up to such an extent that many freight rates were higher than they had been for at least 3½ years, and naturally enough this caused some owners to take their tankers out of the grain trades and revert to the carriage of oil. Whether this trend would continue, of course, depended entirely on the duration of the improved oil demand and this was an unanswerable question as 1960 came to an end.

Mention has already been made of the generally higher level of rates in 1960, but the markets were very weak in most parts of the world during the summer months. In fact, in the early part of March last year there were already signs of a decline, but fortunately for owners inquiry later expanded and April was a fairly active and reasonably encouraging month. By the end of May, however, the summer doldrum period had arrived and although in August it seemed that the worst might be over, this proved to be a "false dawn" and it was well into October before inquiry really started to expand.

Whereas in the previous year Britain and Europe had experienced a particularly dry summer which led to an exceptional demand for imported feedingstuffs in the autumn, in 1960 the weather was the exact opposite and rainfall records were broken almost everywhere. Farmers all over Europe had a struggle to dry their rain-soaked crops, and often the grain was unsuitable for storage and was therefore used straight away. For this reason trans-Atlantic grain chartering in the latter part of the year was often on a disappointing scale, but nevertheless some countries such as Poland and Italy were big importers of North American grain at that time and shipping benefited. As in previous years the Far East was easily the weakest market during the summer months and owners unlucky enough to have tonnage out there often suffered heavy losses getting away from the area, but by the end of the year conditions had improved considerably.

Grain — The Key Commodity

As always in recent years the key commodity on the freight markets in 1960 was grain, but sad to relate one of the busiest trades, namely from the U.S. Gulf to the near Continent, was almost always monopolised by tankers, and these vessels were largely responsible for keeping the rates down to rock bottom levels. At various times in the year congestion was reported in U.S. Gulf ports, and in the early part of 1960 even the Continental ports were clogged with tonnage waiting to discharge. On the basis of gross load and free discharge, rates from the U.S. Gulf to Antwerp/Hamburg range varied from around $6 in January to $5.20 in March, $4.50 in July, $5.25 in October and about $5.50 to $6 at the end of the year. Some of the tankers, however, were fixed on either a lumpsum or an f.i.o. basis and at one time in September, for example, as little as $3.65 f.i.o. was paid for heavy grain from the U.S. Gulf to the near Continent. Rates from the U.S. Gulf to the U.K. were of course substantially better, because the charterers concerned required smaller vessels which would be suitable for the ports in this country. Nevertheless, 12/14,000-tons ships were often taken to main ports such as Avonmouth and London at lower rates than were paid to the smaller ships fixed to the slower and shallower ports. In January 1960 the rate from the U.S. Gulf to the U.K. was around 55s and there was little change in the general level until June, when it had fallen to about 45s and in July to 42s 6d. From August until the end of the year the rate in this trade was generally in the region of 50s, and the year closed with charterers paying about 55s although, as already mentioned, there were variations of several shillings depending on the size of the vessels and the U.K. port of discharge.

In 1960 the St Lawrence Seaway opened for its second season and with the previous year's accumulated experience behind them there were quite a number of owners of various nationalities who had become specialists in Great Lakes trading. Grain fixtures for "first open water" were being reported in January and even in the previous December, and chartering continued steadily throughout the year. In December there were one or two fixtures arranged from the Great Lakes to the Continent for loading at the beginning of the 1961 season. As already mentioned, tankers were much in evidence from the Great Lakes in 1960, just as they were in most other trades, and as always they had a depressing effect on rates. As an indication of the level of rates, $9.60 free discharge was being paid for heavy grain to Antwerp, Rotterdam or Amsterdam in January, $8.75 for similar business in June,

and $7.75 in August, but by September the rate had risen to around $9.50 to $9.75. In many cases larger ships fixed for Great Lakes loading were allowed to complete to fully laden draught in the St Lawrence, but the rate on the completion cargo was always several dollars below the Lakes figure. Needless to remark, Great Lakes grain cargoes were shipped to many other destinations, including the U.K. and Denmark, but the biggest trade was always to Holland and Belgium.

Now that the Lakes are accessible to ocean-going vessels one hears less of full cargo loading in the St Lawrence River, but nevertheless there was chartering reported to many destinations throughout the season. Heavy grain from the St Lawrence to the U.K., for example, was paying around 45s in the early months of the year, but in the mid-summer period the rate fell to about 35s to 40s. Later in the season in October fixtures were being arranged at between 42s 6d and 47s and this was still the approximate level in November, for there were no signs of any frantic activity before the River closed for the winter in the early days of December.

Reference has already been made to large-scale grain chartering from the U.S. Gulf and U.S. North of Hatteras to Poland and Italy in the latter part of 1960, and another big recipient of American grain during the year was the United Arab Republic. Out to the East, hardly a month went by without a grain chartering programme from the U.S. Gulf and U.S. North of Hatteras to India, and rates from the Gulf to West Coast India, for example, were remarkably constant at about 70s for much of the year, although at one time in August charterers secured tonnage at 63s 6d. As in previous years there was a regular flow of grain from the U.S. Gulf to Japan and rates varied from $9.75 in January to $8.50 in March, $10 in May, $8.75 in July, $9 in October and finally about $9.75 at the close of the year. During the summer months when the Far East markets were at their worst many ships ballasted back from the China/Japan area to the U.S. Gulf to load return grain cargoes to Japan.

River Plate

The River Plate grain market opened actively in January and rates were sufficiently high for ships to be attracted down there in ballast. Demand was well maintained for many months but, as usually happens, there was a quiet period in June and July, and much of the autumn was also dull. Nevertheless, owners secured useful employment during the year; especially to the U.K./Continent, Italy and Japan. As always, from the River Plate there was a good proportion of measurement cargo shipped, but heavy grain rates to Antwerp/Hamburg range, for example, varied from 72s 6d in January to 75s at one time in March. In the weak summer period as little as 58s 6d was paid for heavy grain to Rotterdam and during the quiet spell in September and October 55s was accepted for heavy grain to Antwerp/Hamburg range. There was a sharp upward movement at the end of the year, however, and the rate to the near Continent was in the region of 70s. Heavy grain from the River Plate to Japan was paying 85s in February, 92s 6d in April and around 90s in June, but by July a fixture was reported at 81s 3d. Most of the activity to Japan at the end of the year was with measurement cargo, and at one time in November, for example, 96s 3d was paid for 73 cu ft.

There was plenty of grain activity from Australia during 1960 and as always a great deal of chartering was arranged to the U.K. The rate for bulk wheat ex-silo from West Australia to Britain was 80s in February as well as on a number of occasions in April and May, but it then began to decline and was as low as 67s 6d in July. By September, however, there were signs of a revival and the rate from West Australia to the U.K. reached 75s and in November 80s. Many ships, of course, were fixed from the Eastern States to Britain and they received the usual 10s premium over the rate from West Australia. As in previous years the U.K. buyers of Australian wheat usually preferred vessels of around 9/10,000-tons capacity which allowed them maximum flexibility when nominating discharge ports, but larger ships could often get fixed provided they accepted a 2s 6d discount on the basic rate and agreed to three ports of discharge instead of the customary two.

From time to time throughout 1960 ships were fixed for wheat from Australia to Japan, but most of this business seemed to be taken by Japanese vessels. At the beginning of the year a number of ships were chartered for Australian wheat to India and in April/May it was interesting to see tonnage fixed for similar business from Australia to North Korea. Ships were often taken for bulk wheat to Basra and this was sometimes followed by a further voyage from West Australia to the U.K. In the latter part of the year a considerable quantity of Australian wheat was sold to Italy and in late December it was announced that China had bought a large quantity of wheat from the same source. Australian barley and oats were also fixed on many occasions to Europe and from West Australia for example, where such cargoes can be loaded ex silo, the business often proved popular with owners of good measurement tonnage. Large quantities of Australian coal were sold to Japan, but although such business was available from time to time on the London market, the bulk of this trade appeared to be covered by Japanese tonnage. Although much of the chartering was probably not reported, bulk sugar was regularly shipped from Queensland to the U.K. and rates varied from 102s 6d in January to 95s in May, and from a low point of 80s in July up to 87s 6d in November, and a nominal 97s 6d at the end of the year.

The North Pacific

The North Pacific opened the year well but, true to form, rates gradually declined until in June/July/August they reached their lowest ebb. From August/September onwards there were signs of seasonal improvement and by the end of the year rates had recovered to approximately the levels of the previous winter. Throughout the year there was trans-Pacific grain activity to Japan and rates varied from around $7.00 in July to $6.00 in March and April, $4.50 in July/August, $5.75 at one time in October, and finally around $6.50 at the end of the year. There was a fairly regular grain inquiry from the North Pacific to East Coast India, with rates following much the same pattern as to Japan, so that whereas in January owners secured 75s they could not do better than 48s 9d in midsummer but were fixing at a healthier 68s 9d at the close of the year.

In spite of a slowing down in Europe's motor car trade to North America, car ships tended to keep rates for return cargoes of wheat from British Columbia to the U.K. down to rock bottom levels throughout most of the year. In January, for example, rates varied considerably from 64s to 80s but by June odd fixtures were arranged at as low as 50s, and even at one time in October as little as 51s 3d was paid to London. In December, however, a ship secured 72s 6d to Hull and another vessel 65s to Avonmouth. It was also interesting to note that from time to time grain charterers were fixing from British Columbia to picked U.K. ports with 3,000 tons per day discharge free of expense to the vessel, instead of the customary 1,000 tons discharge current rate, but, needless to remark, charterers who made this concession secured cheap ships as a result. Apart from grain fixtures from the North Pacific to the U.K. there was, of course,

regular chartering to the Continent during 1960 and rates for wheat to Antwerp, Rotterdam or Amsterdam, for example, varied from $8.50 free discharge in January to as little as $5.25 at one time in August, but they improved to more than $7.00 at the end of the year. As always, lumber chartering was a regular feature of the North Pacific market, with fixtures from British Columbia to the U.K. providing the chief interest. Rates varied according to the type of ship involved but for Liberty vessels charterers were paying around 100s f.i.o. in January, 66s 9d in July and back to 95s or more in December.

The Far East

In the Far East the year opened with the China cereals market active, but after two or three months inquiry faded away. In the autumn, when demand normally revives, there was certainly more chartering reported, but nevertheless both floods and drought had played havoc with China's cereal harvest and her exports suffered in consequence. In January and February the rate for soya beans from North China to Antwerp/Hamburg range was around 72s 6d f.i.o. but in December, when a number of ships were fixed, the level was no more than 64s. In the summer a number of vessels were fixed for consecutive ore voyages from Hainan Island to North China and occasional ore fixtures were reported during the year from Yulin to Europe. In the autumn several vessels were fixed with rice from China to Cuba and in one or two cases these were combined with return cargoes of sugar from Cuba to China. Fixtures were reported throughout the year for copra from the Philippines to Antwerp/Hamburg range and rates varied from 21 cents per cubic foot in January to as low as 14 cents in July and August and then back again to around 18½ cents at the close of the year. In the second half of the year ships were fixed on many occasions for sugar from the Philippines to the U.S. North of Hatteras and U.S. Gulf.

The Indian market, like all the others in the East, had a very quiet and weak spell during much of the summer and rates to Europe, for example, fell to very low levels. Mormugoa ore charterers were paying around 53s f.i.o. to the near Continent in the first few months of the year, but from July through to the late autumn the rate was seldom above 37s, and it was not until December that charterers started to come under pressure and were paying around 50s. Rates for ore from Mormugoa to Japan varied from about 46s at the beginning of 1960 to 40s to 42s 6d in the summer months, and then about 43s 6d at the close of the year. Many ships discharged American grain in India during 1960 but although some took ore and other export cargoes the majority moved away in ballast to other grain markets such as Australia and South Africa.

As always, maize chartering was the principal interest on the South African market during the year and fixtures were reported from time to time, especially to the U.K./Continent and Japan. Whereas the maize rate to the U.K. in February for example was 72s 6d, it had fallen in July to 52s 6d, but by the end of the year had risen again to about 67s 6d. Maize from South Africa to Japan paid 66s 3d in January, 57s 6d in August and 60s basis three ports of discharge in December. Sugar was fixed at various times from both Mauritius and Durban to the U.K. and occasionally coal from Durban to Rangoon.

In the Mediterranean area it was usually possible to secure ore cargoes from one of the main countries to the near Continent or Baltic, but for much of the year rates were dismally low. Fertilisers and salt cargoes were often workable to the Far East, but much of the tonnage discharging North American grain cargoes in Italy and other Mediterranean countries afterwards ballasted back across the North Atlantic. Towards the end of the year there was considerably more activity from the Black Sea with grain, coal and salt featuring among the commodities available for shipment to destinations all over the world.

On the outward market there were often reports of fixtures of fertilisers from the Continent to India, and similar cargoes were shipped on many occasions to Far East destinations such as China and South Korea. Scrap cargoes from the U.S. North of Hatteras and U.S. Gulf to Japan were a regular feature of the markets throughout the year, and in this particular trade charterers continued to favour the Liberty vessel. The rate was $107,500 f.i.o. in January, but it was nearer $100,000 by April. Then, from the middle of May right through to late November ship after ship was fixed at $103,500 and it was not until December that the level rose again at $110,000.

A few years ago pride of place in any annual market report would go to the trans-Atlantic coal trade, but now only occasional fixtures are reported from Hampton Roads to the near Continent. When such charters were arranged in 1960 the rate was usually around 26s. Hampton Roads coal fixtures were, however, reported on many occasions to such destinations as Rio de Janeiro, Buenos Aires and West Italy, but the main interest was always to Japan. Rates from Hampton Roads to Japan varied during the year from about $8.40 in January to $8.75 at times in May, as little as $8.10 in July, and around $8.40 at the end of the year. Rates on any given day also varied, depending on the size of the vessel involved, the charter commission and the discharging port or range in Japan.

There was considerable chartering activity from Cuba during 1960 and major features were the cancellation of Cuban sugar quotas by America in the summer, and the steady increasing proportion of the former country's sugar being shipped to Russia and China. In the early part of the year the rate for sugar from Cuba to China, for example, was around 90s f.i.o. with owners' taxes, and the route via Suez or Cape of Good Hope, but by the autumn similar business was being arranged at 93s with charterers' taxes. Sugar fixtures from Cuba to the Black Sea with owners' taxes in February at 74s f.i.o. compared with around 60s f.i.o. with charterers' taxes at the end of the year.

Time Charter

Once again a feature of the timecharter market for British owners in 1960 was the active chartering of vessels with delivery U.K./Continent for West African round voyages, and this especially applied to the winter months at both the beginning and the end of the year. A good class 14-knots open shelterdeck vessel was worth about 20s to 21s per ton per month for this business in January and much the same rate again in December, when conditions in the trade were active once more. In July, however, when the markets were quiet and weak a vessel such as already described was worth as little as 17s 6d. At various times during the year British liner companies took tonnage for timecharter trips out to a variety of destinations, including the Persian Gulf and Australasia and, as always, a feature of such business was the close delivery dates required, enabling charterers to fit the chartered ships into tight loading schedules. Particularly in the early months of the year, Japanese timecharterers took many ships for period charters of up to a year's duration, as well as vessels on a timecharter basis to cover single voyages such as from Mormugoa to Japan. Chinese charterers were also fairly active timecharterers in the first six months of the year but they showed little interest from July onwards. American charterers, many of them operating liner services, were often in the market during 1960 and the timecharters varied in length from straightforward trips across the North Atlantic to long periods of a year or more.

Marine Insurance in 1960

A YEAR OF SIGNIFICANT DEVELOPMENTS

By a Special Correspondent

IN marine insurance the past year has been a period of considerable significance and without doubt a number of developments have taken place, both in the British market and elsewhere, which are of more than passing importance. The events of the year have forced on marine underwriters, even if they did not fully appreciate it before, a recognition that the world's shipping industry is passing through a very difficult time. Indeed, from a marine underwriter's point of view the number of vessels laid up last year, of which 1.3 million nrt is under British flag, must inevitably imply a contraction of premium income in the current account of an underwriter who writes a sizeable account in hull risks. Fortunately there has been some improvement in these figures over the year.

There have been encouraging reports from several of the chairmen of some of the larger insurance companies who write a considerable volume of hull business in their marine account, but in general these usually well-informed sources were quite guarded in tone and definitely confined to a survey of the current underwriting picture, which may bear no relation to their marine results when the underwriting accounts are closed at the end of the third or fourth year. On the other hand, the annual statements and returns made to the Board of Trade for marine insurance business transacted by underwriters at Lloyd's during 1959 (which relates to 1957 as a closed year and 1958 and 1959 as current years) showed a small but important increase in premium income in each account. This is, indeed, one of the encouraging features of these accounts. On the claims side of these published accounts the 1957 account showed a total claims settlement over three years of 95.62 per cent of premiums before deduction of expenses. The incidence of claims—21.6 per cent first year, 26.8 per cent second year and 47.1 per cent third year—shown by these accounts, suggested that the time lag for presentation of claims to underwriters for collection is improving, but it remains to be seen whether the claims figures for 1958-59 will continue in this pattern. Although the first indications are grounds for hope that these years will again show an improvement, it is rather too early yet to suggest any certain outcome. Lloyd's accounts for 1959 have again drawn attention to the comparatively small expenses ratio of Lloyd's underwriting syndicates—2.47 per cent for 1957 and an average over three years of 2.58 per cent on a net premium income of £126 million in the marine accounts, as against that of selected British companies transacting marine insurance. From published figures for 25 principal British companies it has been suggested that an expense ratio of 5 per cent or thereabouts on a net premium income of £60 mn in 1959 would be a fair estimate.

Vessels Withdrawn from Lay-up

Over the past year a number of vessels have been withdrawn from lay-up and resumed trading. These have included a number of war-built Liberty type vessels which have now come on to the marine insurance market as navigating risks, after being insured for port risks for upwards of 18 months. Many of these vessels, which are now over 15 years old, are possibly survey-expired or overdue by this time, and the cost of passing the more stringent 16-years classification survey will probably be heavy. The fact that some are resuming trading encourages the view that at all events some owners consider that world trading conditions are beginning to improve. It has been suggested that these war-built vessels are being brought into service with a view to a sale as a trading vessel with survey passed but, apart from sales to certain quarters, it can be anticipated that in the ordinary course of events much of this tonnage will gravitate towards the breakers' yards during the next few years.

This purely economic fact, which is generally recognised by both underwriters and shipowners alike, has induced a decline in tonnage values for those vessels which are still trading. This trend, together with the quite considerable number of vessels which are still laid up and, therefore, insured on port risks terms, must combine to produce a severe contraction in premium income available to the market in London and elsewhere for the year 1960. Modern postwar tonnage has also shown a decline in tonnage values, but this is not nearly so severe as that experienced by war-built tonnage. Much of this modern tonnage is still able to trade at present freights and the more conservative owners will continue to trade these vessels on small profits at "break-even" rates in the hope of the freight market improving as the now obsolescent war-built tonnage is withdrawn from the world markets. It must, also, be remembered that the present insured values of vessels tend to be at rather arbitrary levels which are often considerably higher than the current market values in the sale and purchase markets. There are a number of quite logical reasons for this and although the position is more marked with war-built tonnage it, also, exists with postwar vessels. The possible dangers of this situation, if it progresses beyond certain reasonable limits, are obvious. In many cases this situation has led to a reduction of the amount of business available to the market on "shipowners' interest", freight and disbursements. An overall fall in insured values, despite the somewhat arbitrary bulk premium requirements of marine underwriters for vessels of certain flags and registry, must be reflected in the income of the hull account as a whole.

Joint Hull Formula

Unfortunately, no adjustment of underwriting policy can redress this decline in premium income. Until there is a revival in world shipping, marine underwriters must be content with the reduced income which is available. It may well be that in order to retain an adequate line and premium in their own account some underwriters may be forced to restrict their reinsurance commitments, an action which may prove to be an invigorating tonic in a market which has often been accused individually of writing over-large lines to the detriment of sound underwriting practice. While there are, no doubt, many facets of the arguments to support a revision, at its face value the present Joint Hull Formula may be considered as affording some concessions to shipowners in the very severe freight conditions in which they now find themselves. Additionally, in its present form it may lead the way to assist the London market to meet the growing competition for hull business from those markets abroad which do not recognise the Joint Hull "pattern" of marine underwriting. It is fairly widely known that the French hull market has made considerable inroads on certain sections of hull business which has traditionally been

placed in London, and, obviously, the market must be strengthened to meet this foreign competition.

In retrospect it may be suggested that the age of hull risks forming the average British underwriter's hull account is reducing slowly in conformity with the introduction of modern postwar tonnage into the British merchant fleet. When considered as units, possibly these are not so numerous, but the high insured values which are involved tend to counterbalance this and there is, of course, the gradual elimination of the war-built vessels which have insured values on a very much lower scale. Where the underwriter has a hull account which is more broadly based, then probably the average age of vessels on his underwriting book is very much the same.

Transfers to Greek Registry

One of the features of the year has been the movement of Greek-owned vessels away from the Liberian, Panamanian and Costa Rican flags to the Greek registry, which now stands as the sixth maritime power in the world with over 808 vessels, totalling rather more than 5½ mn tons. There are a number of reasons for this, among which may be quoted the political and economic stability which has prevailed in Greece over the past few years and favourable tax laws on foreign investments, as well as the recent clarification of the position of preferred mortgagees under Greek law. The rising importance of the Greek merchant marine is emphasised by the formation of a Greek National Committee by Lloyd's Register of Shipping to assist the classification society in its work. Much of the Greek merchant fleet is modern postwar tonnage of high value—nearly 3,000,000 grt, tanker and dry cargo.

From the marine underwriting point of view, it must be appreciated also that it is the postwar vessel which will be the first to increase in value as the freight market improves, which will in turn promote a corresponding increase in hull values. It would, therefore, appear to be to the advantage of marine underwriters to try to maintain an adequate line on these vessels until this takes place. It must be realised, nevertheless, that there are still a number of vessels coming off the stocks as new buildings and being delivered to owners, although, naturally enough, these are reducing in number by now. These, in fact, represent the completion of orders placed perhaps five years ago. Some have been delivered and put into "mothball" lay-up immediately. Their presence as disposable tonnage may provide a confusing factor in the ship sales market for quite a period after the freight market does begin to improve.

Whatever the causes of the present recession in shipping, there are many who are optimistic enough to suggest that any factor which tends to increase the volume of surplus funds available for spending on other imports may be sufficient to produce just the impetus to trigger off a revival in shipping. In the opinion of many it needs no more than this. It is as yet too early to judge the effects of the measures taken to protect the dollar position; these will undoubtedly be far-reaching, both in their influence on the world shipping industry as a whole and on the pattern of marine hull underwriting in an international market such as London.

Most marine insurance brokers in London have over the past few months been forced to tell their shipowner clients that the present state of the hull insurance market in London is difficult. Their opinion reflects many of the trends which have already been mentioned. Faced with an active spate of competition from certain markets abroad, the hull broker in London has surely an unenviable task in placing the limited amount of new business on offer at the present time. The cost of hull repairs has in general been fairly stable and there is fair competition for repair work in the North Continental ports.

Some ports indicate that prices of materials and labour costs have been increased over the latter part of the year, and these will have their influence on repair prices. The time lag in shipowners completing deferred repairs seems to be improving.

In the London market some attention is being given to the problems of centralised accounting systems, and already a small settlements arrangement is in operation between brokers and underwriters.

The American Market

The American marine insurance market has, during the past year, been the subject of very stringent inquiry by a subcommittee of the United States Senate. The preliminary reports of this inquiry contained much comment and opinion which, to anyone who is not in close touch with insurance affairs in the United States, is difficult to understand. It is apparent, and subsequent events tend to confirm this, that ocean marine underwriters in America are under considerable pressure to increase their underwriting commitments in certain directions beyond what they have thought prudent in the past. The visit of Mr A. C. Grover, chairman of Lloyd's, to give evidence on the organisation of Lloyd's before this committee, was a significant occasion in the insurance affairs of both markets. His very lucid statements of the general policy of Lloyd's underwriters in the conduct of their business in the wide international field can seldom have been excelled in clarity and precision.

The United States was also the venue of the annual conference of the International Union of Marine Underwriters this year when the American Institute of Marine Underwriters invited members to meet in Washington. This was the first occasion that an international gathering of marine underwriters had been held in the United States; and delegates from over 45 countries were present, under the chairmanship of Mr L. Rostock-Jensen, of Copenhagen. Among the many important underwriting topics discussed were the insurance of nuclear-propelled ships and the St Lawrence Seaway. The St Lawrence Seaway has now completed its second season of navigation and for marine underwriters the casualty records for vessels trading to the Great Lakes have not proved favourable; so much so, that scale additional premiums for the 1961 season are to be increased. Over the past year it has become apparent that while considerable improvements have been made to navigational facilities in the Seaway and Great Lakes, and many of the earlier teething troubles have been eliminated, the serious claims record of ocean-going tonnage using the Seaway cannot be ignored.

Nuclear Risks

The discussions of the underwriting problems of nuclear propelled ships at the conference of the International Union were, of course, overshadowed by the knowledge that the *Savannah* was shortly to begin trials and would require marine insurance cover in some form or another. The announcement of the Maritime Administrator—Admiral Ralph E. Wilson, who is chairman of the Federal Maritime Board, discloses that the Maritime Administration will assume hull and war risk cover for the new vessel, although commercial insurers would be approached to provide protection and indemnity cover, and also nuclear liability cover to a limited amount. The occasion for this announcement, which was the annual dinner of the American Institute of Marine Underwriters in New York last November, was also used to intimate that changes were contemplated in the American War Risks and Strikes Clauses and to emphasis that the U.S. Maritime Administration interim binder scheme for war risk

(Continued on page 104)

Modernisation of Clydeside Shipyard

EXTENSIVE WORK BY BARCLAY CURLE

THE CLYDESIDE shipyard of Barclay, Curle & Co Ltd, situated at Clydeholm on the north bank of the river, is of course part of the Swan Hunter Group; and in common with the other shipyards of the group it has been extensively modernised to allow modern methods of ship construction to be employed efficiently. The work involved in the modernisation has now been completed, and the excellent facilities for steel fabrication which are now available can be seen from the accompanying colour illustrations, which appeared originally in the works magazine of the Swan Hunter Group.

The work of modernisation has centred round two berths, one (No 5) extended, and the other (No 6) a new berth. The latter is 720ft long and 110ft wide, and allows the yard to build tankers of up to 45,000 dwt. The extended berth is now 620ft long and 88ft wide. The centre of the new berth consists of a concrete slab 38ft wide: at the upper end of the berth the concrete is supported by the ground, but for the last 325ft at the river end the weight is taken on piles.

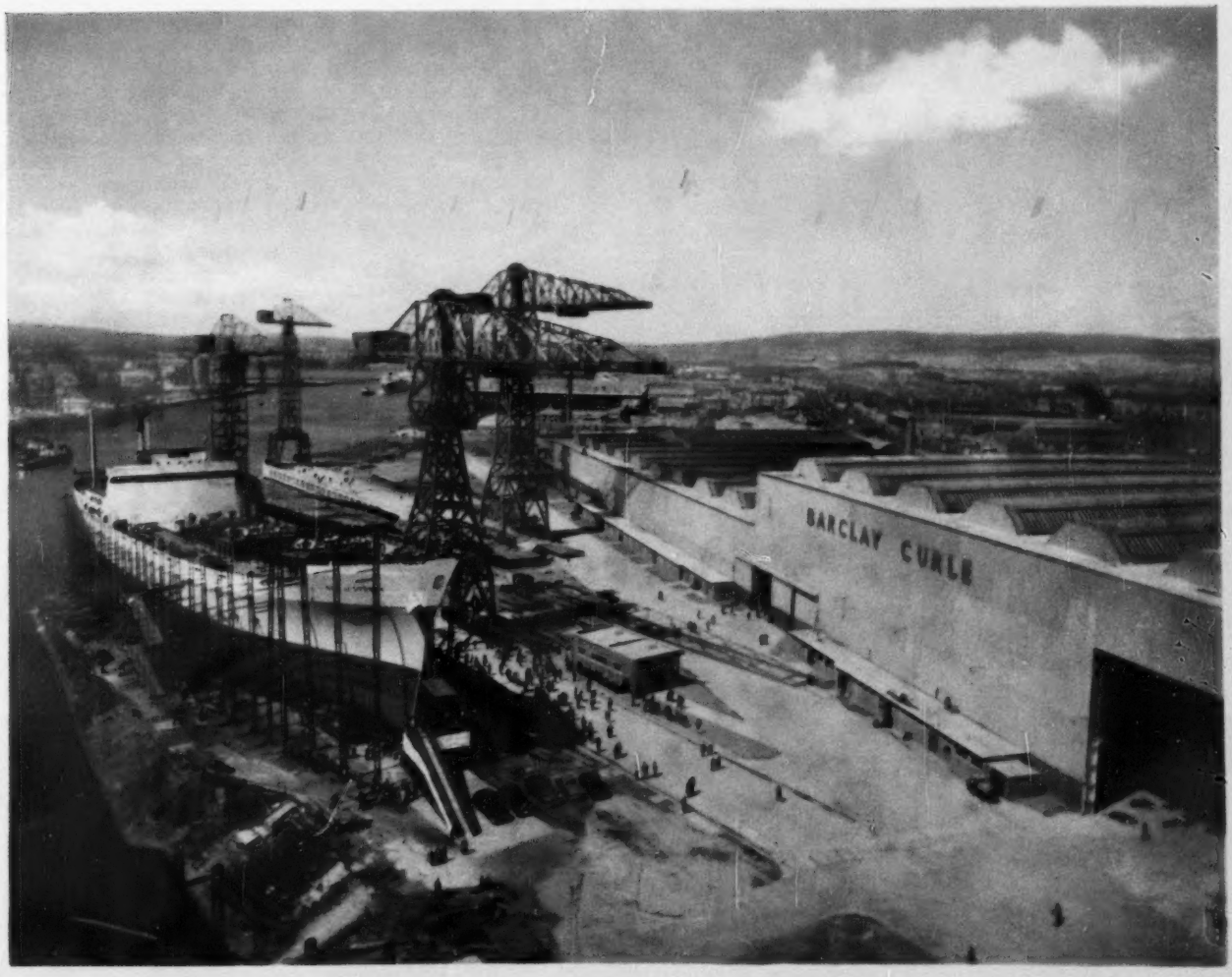
60-tons Cranes

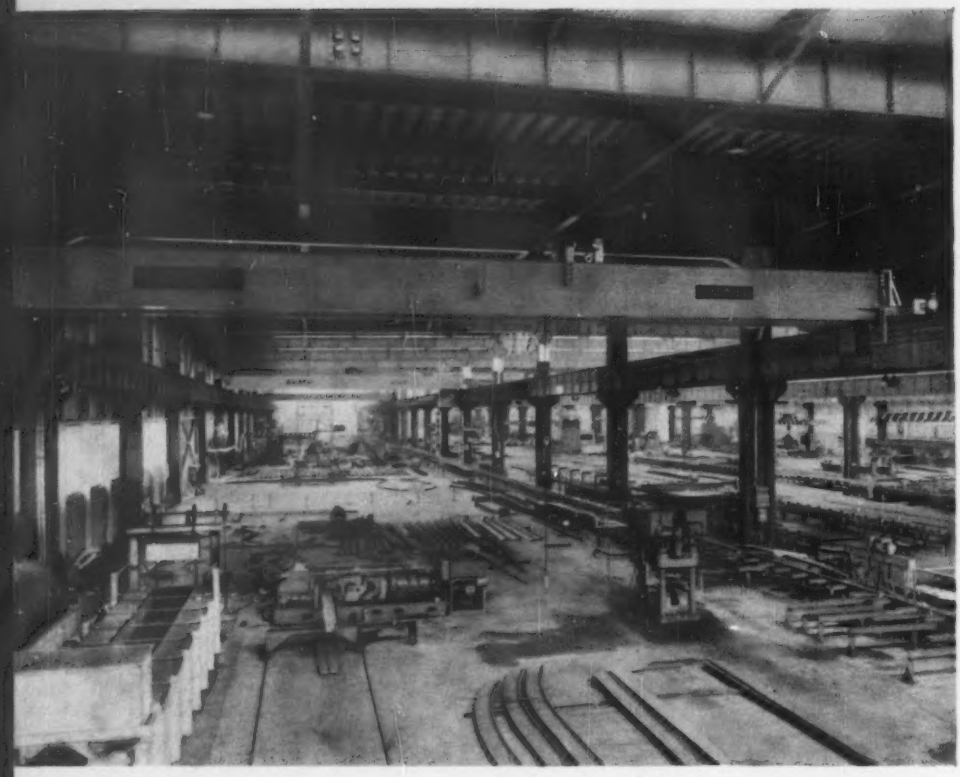
On either side of the new berth is a crane track, each track accommodating one 60-tons and one 10-tons cantilever crane. These tracks can be seen in the illustration below, in which the extended berth is occupied by the Ellerman liner *City of Sydney*, the first ship built on it, while the new berth has on it some double bottom sections of its first ship, a vessel building for the Hopemount Shipping Company. The *City of Sydney* is described elsewhere in this issue. The lower ends of the crane tracks are supported on piles, and these also support a suspended floor which is used to accommodate offices, stores and the necessary services for the two building berths adjacent to them.

Continuous Run of Buildings

Behind the berths there have been constructed in a continuous run a new steel stockyard, platers' shed, welding shed and unit storage areas. These have a roadway at each side and linking transverse roads which serve as feeders to the building berths for material which does not need to pass through the work sheds. Between these areas and the roadside boundary are further new buildings. One houses the mechanics' workshop, electricians' workshop, power house, blacksmiths' workshop, finishing shop, burning shop, canteens and locker rooms, lavatories etc. Another accommodates a new joiners' shop and central boiler house capable of heating all the buildings in the establishment.

The new layout of the yard has been described in the firm's works magazine. The main idea behind the scheme was to provide a straight line production system. Steel is delivered by railway to the steel storage area, where





A view of the platers' shed. In the foreground is the cold frame-bending machine

it is sorted and passed into the platers' shed. After being processed in the platers' shed it is transferred to the marshalling area from whence it passes to the assembly shed and finally to the unit storage area or direct to the building berths.

Plates and sections are delivered to a rail siding in the stockyard, which is situated at the west end of the platers' shed. From the stockyard the material is fed as required into the platers' shed on motorised roller conveyors: after processing, it is transported by electric overhead travelling cranes to the marshalling area and then to the assembly shed where the various units and sub-assemblies are fitted together and processed into complete units. The completed units are then transported to the unit storage area, or by means of special heavy duty trailers are taken direct to the travelling tower cranes for erection on the building berths. The overall dimensions of the steel processing area, including stockyard, platers' shed, assembly shed and unit storage area, are 1,215ft by 276ft.

The steel stockyard has a storage area for plates and sections of 276ft by 260ft divided into three bays, one for sections and two for plates. Each bay is served by a 10-tons electric overhead travelling crane mounted on gantries at a rail height of 30ft. The stockyard is located adjacent to the west gable of the platers' shed and openings are provided in the gable for the entry of plates and sections by means of automatic roller conveyors, separate conveyors being provided for plates and sections. Off-loading, sorting and loading of plates on to the conveyors is carried out by means of vacuum lifting beams fitted to the overhead travelling cranes. A pneumatic-tyred shunting road tractor has been provided to facilitate shunting operations. The stockyard area is illuminated by sodium vapour arc lamps with floodlight fittings. For possible future extension an area of about 3½ acres to the west of the stockyard has been left undeveloped.

An annexe to the west gable of the platers' shed accommodates the hydro-level plate-straightening machines, which are fed from the stockyard plate conveyor, these machines being capable of straightening plates of thicknesses ranging from ⅛in to 1½in. Adjacent to the steel stockyard gantry the platers' shed extends eastwards for a distance of 500ft and has an overall width of 276ft. The shed is divided into three bays having girders carrying 10-tons electric overhead travelling cranes at a rail height of 30ft above floor level. The middle and



The two large berths seen from the river, with the new crane tracks and cranes



The lengthened fitting-out wharf, with the firm's North British Engine Works on the right

south bays of the platers' shed are laid out for handling and processing of plates, and in the north bay the sections are worked.

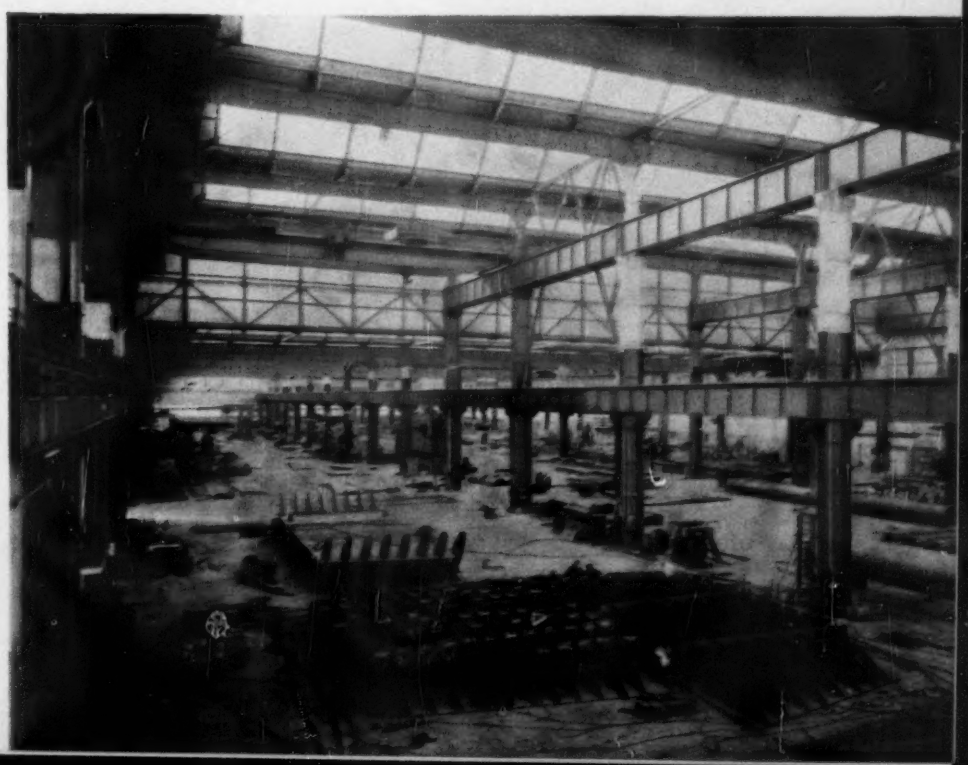
The layout of the plate working area in the platers' shed and the capacity of the various machines and conveyor tables are arranged for the transport and processing of plates with a maximum length of 45ft and a maximum width of 12ft. On the entry at the west end of the shed, plates are sorted by a 10-tons Semi-Goliath crane. A plate marking area is located adjacent to the sorting area, and after being marked the plates are taken to the various processing machines. In the centre bay there are two Oxyplane flame cutting machines fed by a motorised conveyor 285ft long, with push button control panels for each machine. Also in the centre bay of the platers' shed is a duplex longitudinal profile cutting machine which cuts two plates simultaneously. Two motorised conveyors are provided, each 137ft long.

The sections can be transported from the steel stockyard to any one of five work stations along the length of the section bay in the platers' shed by a motorised conveyor 535ft long, the movements of this conveyor being automatically controlled by one operator from a cabin located inside the shed high up on the west gable. The appropriate work station to which the section material is to be delivered is pre-selected on a control panel in the cabin and the conveyor is activated from the same panel. Frames are set by a cold frame-bending machine at the west end of this bay. In addition a 70-ft long oil-fired section heating furnace is provided, with furnace blocks and ancillary plant: further east is an area for scrieve boards.

After being processed, sections are transported to the marshalling zone or to the assembly shed by one of the two 10-tons overhead travelling cranes in the north bay. The crane rails for the 10-tons electric overhead travelling crane in this bay have a continuous run from the west gable of the platers' shed to the east end of the unit storage area, a distance of some 950ft. Between the beam working area and the marshalling zone the lighter class of stiffeners etc are worked before being dispatched to the marshalling zone or to the assembly shed.

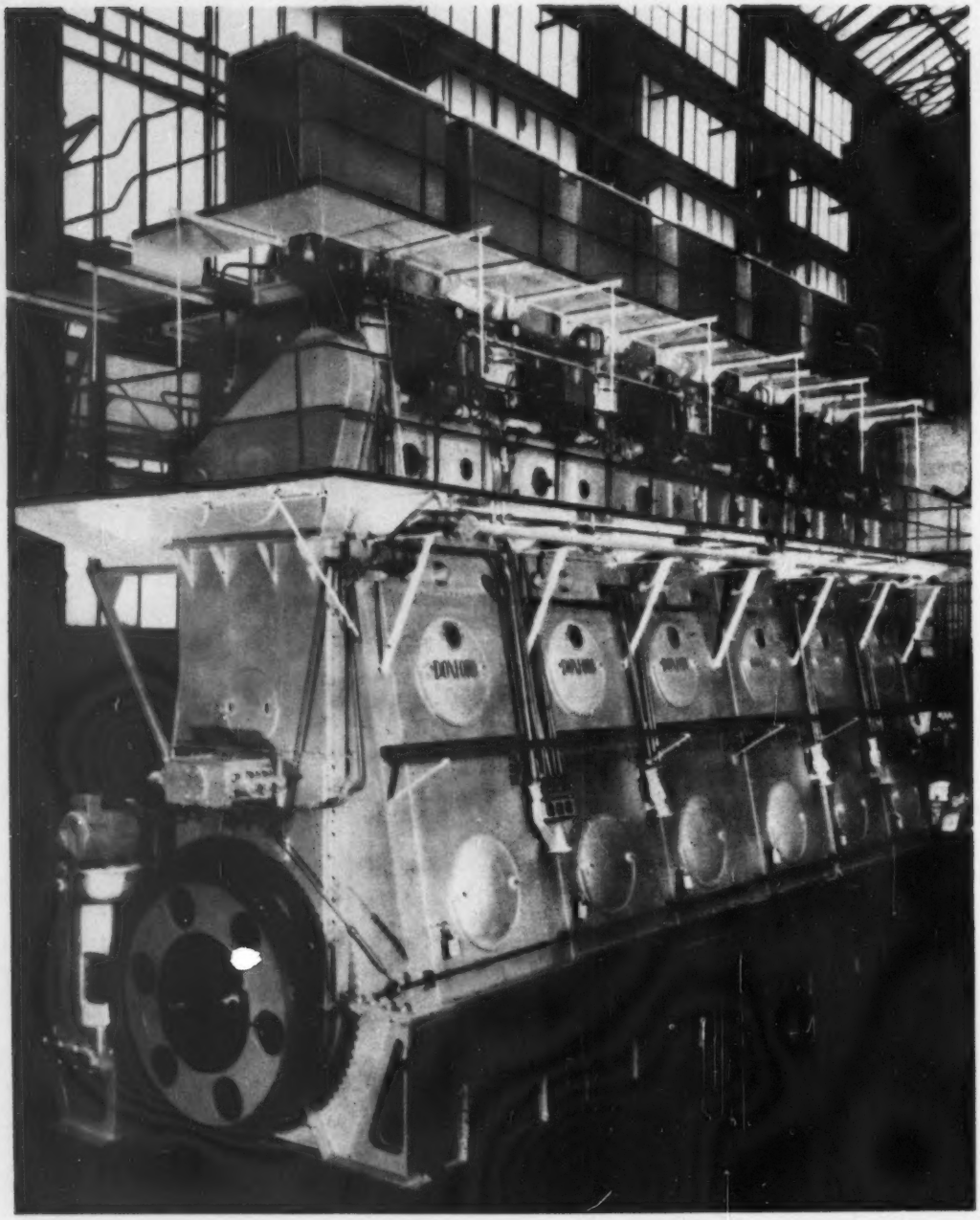
The assembly shed is a continuation of the platers' shed but has a higher roof and additional girders with crane rails to accommodate 30-tons electric overhead travelling cranes 60ft above the floor level to allow bulkheads etc to be turned over. Two 30-tons cranes in the centre and south bays, working in tandem, are used to lift loads of

(*Continued on page 52*)



The assembly shed, with 60-tons double bottom units under construction

The New Doxford Diesel Engine



ONE OF the outstanding events of 1960 was the completion of the first Doxford "P" range engine, seen on test bed trials in June and described in THE SHIPPING WORLD of July 6. This engine, which has been designated type 67PT6, is a six-cylinder turbocharged engine with cylinders of 670mm bore and a combined stroke of 2,100m: at 120 rpm the service output is 10,000 bhp. It is being installed in the oil tanker *Montana*, 20,000 dwt, now nearing completion at the Sunderland shipyard of Sir James Laing & Sons Ltd, for the Norwegian shipowners A/S Tanktransport, Tonsberg.

The new "P" range of engines will be built in three different sizes of cylinder bore—850mm, 670mm and 560mm. It is of interest to note that the tests on the first "P" type engine were so satisfactory that Doxfords decided to go straight ahead with the construction of the 850-mm bore engine, and the first of these is expected to be completed towards the end of this year. The continuous rating of this larger bore engine, which has a combined stroke of 2,500mm, will be 18,000 bhp at 115 rpm.

The 670 mm bore engine is being supplied either as a turbocharged unit or normally aspirated; there is still a proportion of British shipowners who prefer the latter type, although they are in the minority.

Oil in 1960

STABLE PRICES DESPITE EXCESS AVAILABILITY

A SHIPOWNER may think of oil either as a fuel or a bulk commodity, depending on the type of ship that he runs. Considering it first as a fuel, oil was notable in 1960 chiefly for its stable price. Price changes were fewer than in any other year in the past decade, and indeed the price of bunker fuel in the U.K. remained the same throughout the period. This price stability is perhaps surprising at a time when competition between oil companies was high. However the price maintained was about as low as has been achieved in recent years, and reference to Table IV shows that it is necessary to go back to 1954 to find a lower price, while in the intervening period prices rose at one point to a figure almost twice this level.

Table III shows that the growth in the importance of oil as a fuel continued during the year, both in absolute and relative terms. Coal-fired tonnage diminished, helped no doubt by the depression in shipping, while both oil-fired steamers and motorships continued their upward trend. In point of fact the major part of the remaining coal-fired tonnage must be numbered among ships laid up, and it is questionable whether much of it will see service again. However a new fuel is now appearing on the horizon, and the Statistical Tables of Lloyd's Register of Shipping (from which Table III is compiled) record the existence of two nuclear-powered merchant ships, the Russian *Lenin* and the American *Savannah*. It seems inevitable that within another decade the proportion of nuclear-powered ships will be growing at the expense of the proportion which is oil-fired, but as yet it is impossible to say how soon this swing is likely to begin. What is clear is that before long naval bunker contracts in more than one country will begin to be affected.

TABLE I—London Tanker Brokers' Panel Indicator
(Average Freight Rate Assessment)

Effective date	Average	Increase (+) or decrease (−) on assessments of 3 months earlier (Per cent of Scale)
1- 4-54	*Scale + 14.4 per cent	—
1- 7-54	Scale + 4.7 per cent	− 9.7
1-10-54	†Scale No 2 + 7.9 per cent	+ 3.2
1- 1-55	Scale No 2 + 12.8 per cent	+ 4.9
1- 4-55	Scale No 2 + 7.5 per cent	− 5.3
1- 7-55	Scale No 2 + 2.2 per cent	− 5.3
1-10-55	Scale No 2 + 8.1 per cent	+ 5.9
1- 1-56	Scale No 2 + 40.0 per cent	+31.9
1- 4-56	Scale No 2 + 17.0 per cent	−23.0
1- 7-56	Scale No 2 + 37.2 per cent	+20.2
1-10-56	Scale No 2 + 41.3 per cent	+ 4.1
1- 1-57	Scale No 2 + 74.8 per cent	+33.5
1- 4-57	Scale No 2 + 67.7 per cent	− 7.1
1- 7-57	Scale No 2 + 31.9 per cent	−35.8
1-10-57	Scale No 2 + 30.0 per cent	− 1.9
1- 1-58	Scale No 2 + 27.3 per cent	− 2.7
1- 4-58	Scale No 2 + 24.6 per cent	− 2.7
1- 7-58	Scale No 2 + 24.1 per cent	− 0.5
1-10-58	Scale No 2 + 21.5 per cent	− 2.6
1- 1-59	Scale No 3 + 13.9 per cent	− 7.6
1- 4-59	Scale No 3 + 11.6 per cent	− 2.3
1- 7-59	Scale No 3 { + 9.5 (13,500-25,000)	− 2.1
	{ − 4.3 (over 25,000)	—
1-10-59	Scale No 3 { + 8.1 (13,500-25,000)	− 1.4
	{ − 4.8 (over 25,000)	+ 0.5
1- 1-60	Scale No 3 { + 6.9 (13,500-25,000)	− 1.2
	{ − 5.3 (over 25,000)	+ 0.5
1- 4-60	Scale No 3 { − 2.1	− 9.0
	{ −12.3	− 7.0
1- 7-60	Scale No 3 { − 1.4	+ 0.5
	{ −12.6	− 0.3
1-10-60	Scale No 3 { − 2.4	− 1.0
	{ −12.3	+ 0.3
1- 1-61	Scale No 3 { + 0.2	+ 2.6
	{ −12.3	+ 0.0

* London Scale. † Known as "London Scale No 2".

TABLE II—Laid-up Tanker Tonnage
(1st of each month)

Month	1958 No.	1958 Tons d.w.	1959 No.	1959 Tons d.w.	1960 No.	1960 Tons d.w.
January	142	2,032,000	276	4,100,000	354	5,746,972
February	198	2,920,000	285	4,307,144	343	5,528,000
March	233	3,545,000	275	4,126,000	343	5,512,000
April	277	4,240,000	315	5,000,000	358	5,869,000
May	326	5,000,000	380	6,254,270	363	6,036,000
June	349	5,395,000	420	7,000,000	381	6,332,000
July	362	5,878,000	440	7,395,000	392	6,450,000
August	342	5,458,000	459	7,750,000	378	6,149,000
September	306	4,729,300	476	8,000,000	355	5,757,000
October	294	4,495,000	489	8,245,000	318	5,050,000
November	277	4,110,000	459	7,671,363	253	4,032,000
December	277	4,151,000	386	6,338,404	228	3,497,000

(Source: Davies & Newman Ltd, London)

Expanding Production of Oil

The year 1960 was one of expanding oil production. Exceeding for the first time the thousand million tons mark, crude oil production in the whole world rose by 73 mn metric tons to reach a record of nearly 1,052 mn tons. Three-fourths of the increase occurred in the free world outside the U.S.A., and of this the Middle East accounted for two-thirds. On a percentage basis, last year's rise in total world output of about 7.5 per cent was slightly above the average annual rate of increase during the 1950s, which brought about an almost exact doubling in world production over the past 10 years (from 523 mn tons in 1950). In volume, last year's increase was rather higher than in 1959, and whereas the U.S.A. then showed an increase of 17 mn tons, last year's output there fell by two million tons. Output in the U.S.S.R. again rose sharply by over 17 mn tons, so maintaining its advance over the past six years.

Last year's 15.6 per cent increase in the Middle East, bringing production to about 267 mn tons, reflects the extraordinarily rapid expansion of demand in Western Europe where, however, consumption will now probably rise rather less rapidly than it has recently. Increasing supplies from the French Sahara, the appearance of Libyan exports in a year's time, and rising exports from Russia, will also slow down the recent rate of expansion in the Middle East.

Tanker Freight Rates

The year 1960 saw the first significant rise in tanker freight rates since they descended to a low level in the latter part of 1957. Opinions are divided as to whether or not this presages a return to better times for tanker owners: a recent pointer to expert opinion on the subject is the fact that the London Tanker Brokers' Panel Average Freight Rate Assessment for January 1 shows no increase for large tankers, and only a relatively small one for general purpose vessels vessels (Table I).

Surveying the year in the tanker markets, Davies & Newman Ltd recall that during the greater part of 1960, rates remained at uneconomic levels except for the larger

TABLE III—Fuel Analysis of World Tonnage
(Excluding ships of less than 100 tons gross)

Year (July)	Steamships burning: Coal Tons gross	Steamships burning: Oil Tons gross	Motorships Tons gross	Fuel percentages Coal	Fuel percentages Oil
1914	43,859,381	1,310,209	234,287	96.6	3.4
1932	38,194,758	20,135,006	10,038,377	55.9	44.1
1933	36,373,859	20,053,273	10,200,392	54.6	45.4
1934	33,895,555	19,857,711	10,604,526	52.7	47.3
1935	32,537,556	19,885,070	11,304,691	51.1	48.9
1936	31,947,618	19,766,668	12,290,599	49.9	50.1
1937	31,746,906	19,775,821	13,748,713	48.6	51.4
1938	31,578,746	20,058,452	15,232,953	47.2	52.8
1939	31,015,069	20,575,676	16,918,687	45.3	54.7
1948	18,080,305	45,020,438	17,190,850	22.5	77.5
1949	17,413,643	45,805,553	19,351,719	21.1	78.9
1950	16,239,487	47,303,395	21,040,273	19.2	80.8
1951	14,656,710	49,152,663	23,435,671	16.8	83.2
1952	13,558,303	50,472,170	26,149,886	15.0	85.0
1953	12,136,507	52,100,262	29,115,031	13.0	87.0
1954	11,131,288	54,358,576	31,931,662	11.4	88.6
1955	9,846,491	56,198,776	34,523,512	9.8	90.2
1956	9,091,962	58,407,383	37,701,014	8.6	91.4
1957	8,532,693	60,760,389	40,952,999	7.7	92.3
1958	8,198,103	63,525,707	46,309,921	6.9	93.1
1959	7,487,153	66,267,154	51,181,162	5.2	94.8
1960	6,314,654	67,402,846	55,891,704	4.9	95.1

(Source: Lloyd's Register of Shipping)

market vessels, but towards the latter part of the year an improvement in trading conditions permitted even general purpose sized ships to trade at a profit. As a result of this, plus a greatly increased rate of breaking up older tankers (mainly by major oil companies) the laid up total at the end of the year is the lowest since the beginning of February 1958, namely 211 vessels of about 3,175,000 dwt. Another factor which has affected the total of idle tankers is the very large number which found employment this year in the grain trade. It is interesting to compare this latest laid up figure with the highest postwar total, reached in October 1959, of about 8,250,000 dwt.

Persian Gulf Demand

Throughout the year, the main interest has been for Persian Gulf black oil tonnage. During January rates around Scale minus 42½/45 per cent were paid, falling during February to minus 50/57½ per cent. The period from March to September was one of extreme depression with rates reaching as low as Scale minus 72½ per cent on occasions. By the beginning of September, however, the Persian Gulf rate was again at Scale minus 57½ per cent, from which point it rose slowly and by the beginning of November it had reached Scale minus 40 per cent. Thereafter a greatly improved demand on the part of practically all London charterers brought about further increases in rate up to the point at which Scale minus 17½ per cent was paid for late December tonnage. December ended, however, with several unfixed early vessels in the Persian Gulf, and charterers were able to depress the rate for tonnage up to mid-January loading by stages to Scale minus 25 per cent, minus 30 per cent, and even Scale minus 40 per cent. Although the British major companies were the principal Persian Gulf charterers, the year saw a remarkable increase in the volume of chartering to Japan, and this compensated for the almost total absence from the market of French charterers whose requirements were limited by increased production from North African sources together with increasing deliveries of French-flag supertankers.

Demand for trans-Atlantic black oil tonnage at no time reached the proportions of the requirements from the Persian Gulf, and even during the latter part of the year the increased demand was almost entirely taken up by supertankers which accepted cargoes as back hauls while engaged in the Persian Gulf or Sidon to USNH trade.

With regard to the Black Sea, during the first half of the year medium-sized tonnage was in fair demand, and secured rates down to Scale minus 45 per cent. However following the seizure of the Cuban refineries, and the subsequent agreement over the supply of Russian oil, very few details of fixtures have been reported but it is known that rates paid have been substantially higher than those which could be obtained on the open market.

Once again, the market was practically devoid of any long term period inquiry, although a London major fixed two medium-sized Norwegian clean vessels around the middle of the year for three years' trading at 15s on time-charter basis. Apart from this, three contracts of affreightment, each for about three years, were concluded from the Black Sea to Japan covering a total of some 3,500,000 tons of oil.

TABLE IV—United Kingdom Main Installation Bunker Oil Spot Price Indications from 1952 to 1960

(Per long ton of 2,240 lb ex-wharf)

Effective date	Marine fuel oil	Marine diesel fuel
	s d	s d
1952: August 15	170 6	249 0
October 17	157 6	—
November 1	—	236 0
1953: April 15	137 6	221 6
July 27	149 6	233 0
August 14	—	228 6
October 15	142 6	—
November 1	—	221 6
1954: January 1	—	219 6
February 20	—	224 6
May 17	—	218 6
July 26	—	215 0
October 15	—	227 0
1955: February 1	—	236 0
February 18	147 6	—
June 1	—	228 0
August 5	155 0	—
August 12	—	235 6
1956: February 8	160 0	240 6
March 3	—	244 6
July 4	166 0	250 6
August 4	—	246 6
October 20	169 0	253 6
December 10*	236 0	318 0
1957: February 14	238 0	322 6
April 8	211 0	293 0
May 23	199 0	283 0
July 1	187 6	164 6
August 16	—	259 6
December 12	182 6	249 6
1958: January 17	—	244 6
January 29	172 6	—
February 7	—	240 0
February 25	167 6	—
March 17	—	235 0
August 8	—	240 0
September 18	153 6	—
November 27	—	245 0
1959: January 2	—	250 0
January 21	—	255 0
May 1	—	245 0
May 23	—	239 0
June 11	—	233 0
July 14	—	230 0
September 3	—	223 0
September 25	—	230 0
October 23	143 6	—
1960: January 16	—	236 6
February 19	—	230 0

(* This and following effective dates all approximate
(Contract prices are 10s cheaper)

TABLE V—Tanker Market Average Freight Rate Indicators

	Major sterling routes (Scale) (per cent)	Major dollar routes (ATRS) (per cent)	Consecutive fixtures (ATRS) (per cent)
1959			
December	−44	−43	−48
1960			
January	−44	−48	−58
February	−51	−57	−63
March	−62	−53	−60
April	−69	−53	−52
May	−65	−67	−60
June	−65	−59	−54
July	−65	−57	−59
August	−61	−59	−58
September	−48	−55	−61
October	−41	−51	−58
November	−39	−43	−58

(Source: W. G. Weston Ltd)

MODERNISATION OF CLYDESIDE SHIPYARD

(*Continued from page 49*)

up to 60 tons in both bays. In the north bay sub-assemblies are prepared, and for handling these there are in addition to two 10-tons overhead cranes, twelve column-mounted jib cranes of about 3-tons capacity which help to relieve the 10-tons cranes.

The unit storage area for completed fabricated units is on the east side of the assembly shed, the units being transported from the shed by the 30-tons cranes on 60-ft high gantries which are a continuation of the assembly shed crane girders. The columns and main beams supporting these gantries are identical to those of the assembly shed to permit extension of the assembly shed should the need arise.

The mould loft is situated directly over the plate marking area of the platers' shed, and has an unobstructed floor area of 180ft by 100ft.

The fitting out wharf is at the North British Engine Works at the west end of the shipyard, and communicating roadways are provided for the transport of equipment from the shipyard to the fitting out wharf. The quay wall has been extended by about 150ft so that tankers of about 45,000 dwt can be accommodated at the wharf with their engine room in the vicinity of the 150-tons crane for shipment of main machinery. Supplementing the existing 150-tons tower crane, a travelling crane of 10-tons capacity has been provided for shipment of smaller pieces while a ship is being fitted out.

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Ship Sale and Purchase Market

MANY INTERESTING TRANSACTIONS IN 1960

By a Special Correspondent

THERE is always a lot of interest in the ship sale and purchase market, and however the year fares—with prices high or low—there are always ships large and small being sold. The year 1960 has, as usual, been ripe with absorbing interest and it has been particularly notable in terms of high-priced transactions. There has been considerable interest in modern tonnage, for, as is easily appreciated in these days when newbuilding costs are so high, it is so much easier and for that matter cheaper to buy a modern ship with fairly prompt delivery. In the cases of many of the world's shipyards today delivery quotations are now rather shorter than for some time past, but the fact still remains that for most large ships a prospective buyer would have to face a wait of perhaps a year, apart, that is, from the cost factor. There are of course many yards which are now able to quote fixed prices, but others are still quoting on escalation clauses.

From the point of view of any prospective owner who has the necessary finance available, there are these days many opportunities to buy newbuilding contracts, either from the owners themselves or on many occasions from the shipyards who have had contracts left on their hands.

In such cases new owners are able to obtain bargain ships, for often enough the shipyards have received several instalments towards the original contract price of the ship from the original contractors, and so are able to take less than cost from any likely buyer. In other cases it seems that shipyards, and for that matter owners who have for some reason or other to dispose of modern tonnage, are willing in certain circumstances to sell at a discount, possibly in order to take the ship off their hands. Such transactions are no doubt unfortunate for the sellers, but as far as the buyers are concerned they provide a good prospect for the future, with dry-cargo freights having rather a better time of late.

Surplus of Tonnage

During 1960 there have been considerable moves for reducing the weight of tonnage on the market. The better freights have brought about large-scale reductions in the tonnage laid up, and the scrapping of old and not so old tonnage has continued apace.

The trouble with the present situation is that there is still a considerable volume of new tonnage to come along from the world's shipyards, apart from contracts being placed at present, and while the volume of tonnage disposed of for scrap has expanded it seems clear that it has not yet reached such a level as to counteract the tonnage being added from the builders.

There are varying schools of thought as to whether there is in fact a surplus of tonnage at present, for some people feel that there will be an expansion of demand for tonnage in the future which will absorb the present obvious surplus. This would presumably imply that there was no need for the wholesale scrapping of old ships, but at the same time it seems clear that in the long run continued scrapping would be of great benefit to the industry, for it would obviously reduce the press of tonnage, and when freights do start climbing rather more swiftly the greater demand will reflect to the benefit of the owners.

While many owners of war-built tonnage have sold such ships for demolition during the year, there have also been a great number of such ships sold for further trading. Prices have been at a level of over £100,000, with various slight ups and downs, and at the year's end the value of such a ship was about £105,000. These prices are, of course, subject to the usual variations as regards tonnage, age and survey position and while standard type ship prices have wavered round the £100,000 mark, such a level has generally been for a good class ship with survey passed. Ships due for survey and perhaps in not so good conditions have changed hands during the year for as low as about £55,000 with "as lies" delivery.

Perhaps the best example of ships being left in the hands of shipbuilders is provided by considering what have become known as the "Carras contracts". These were six 14,250-dwt cargo motorships building to Greek account by de Schelde, Flushing. For some considerable time the six ships were in the shipyards in varying states of construction. As the months went by the later vessels in the series were launched and neared completion. At least one of the ships had done trials. Early in the year, influenced by signs of improved freights, buyers started to show interest in the ships. The first sale was yard No 295 which went to the Cia. Naviera del Vapore Albia SA, Monrovia, and soon afterwards No 296 went to the Polish Government. In both cases the price was something in the region of £1 mn—for a vessel of this type and class a very reasonable price, with prompt delivery.

Moroccan Purchasers

There was a gap of some months and then, within a short space of time, three more of these contracts were sold at about £1 mn each. The first was bought by associates of Erhardt & Dekkers, Rotterdam, and then almost at the same time came details of two others sold to the Morocco Navigation Company, a government organisation. These disposals left only one of the six original ships, and towards the end of the year this was reported to be negotiating.

As far as the Moroccan purchase of two of these contracts was concerned this deal came shortly after the Moroccans had entered the market by purchasing another Dutch newbuilding contract, this time at the Dordrecht yard of the De Biesbosch concern. This was a 10,500/12,500 open/closed shelterdeck motorship originally ordered by a London Greek firm, and the Moroccans paid £850,000 for her. She was reported to have been contracted for by the original owner for £1,150,000, so that to the new owners she was undoubtedly a bargain. In addition they got very good terms of 30 per cent cash and the balance over ten years, under a Netherlands-Morocco trade agreement. The Dutch shipyard was to receive the balance immediately from their Government which would recover the instalments under the trade agreement. When the two Carras contracts were sold to Morocco it was said that terms had been arranged under the same trade agreement although the actual amount of deposit and the length of payment was not reported. It was, however, reasonable to assume that the terms would be something akin to those in the other Dutch-Moroccan transaction.

These were not the only new vessels to change hands, for it has been a year of many such transactions. In October the Russians took a Dutch newbuilding tanker, originally ordered for Greek account at £1.6 mn. Built by the Netherlands Dry Dock Co, she was of 24,700 dwt and had been launched under the name *Delian Spirit*. She gave almost prompt delivery and was renamed *Adler*.

At just about the same time the Russians went to a Japanese yard and took over another big contract, this time for the *Kate N.L.*, a 39,200-dwt tanker. She was building by the Harima Zosensho K.K., Aioi, and had been launched on November 20. No price was reported but she was said to have cost $6 mn to build and she gave prompt delivery and was renamed *Mir*. The Russians were interested in several other modern tankers but later said they were not going to buy secondhand vessels but would only be interested in taking over contracts.

During November another Russian-Japanese deal was arranged, this time for the 40,000-dwt *Golden Arrow*, built by the Iino Shipbuilding & Engineering Co at Maizuru. They paid $140 per dwt or about $5.7 mn for the ship, which had been launched in February for a Greek company. Initial reports said she had been sold by the Greek owners but this was denied and it afterwards became clear that the Japanese yard had sold her. Apparently faults had been encountered on her builders' trials which had caused her non-delivery. She was renamed *Druzhba*.

These high price resale contract deals have of course tended to overshadow the market, and they have brought with them the usual crop of rumours about further transactions. It seems clear that there must be a considerable number of contracts available for sale, at good prices.

In the past we have usually used the standard type of ship as the main pointer to the state of the market, but although such ships have received to some extent a new lease of life by recent activity, there can be no real long-term prospects for such ships. There are, of course, certain trades which call for what are now looked upon as Liberty-sized ships, and in these there is trading for such ships. At the same time the volume of fast modern tonnage with greater capacity which is being built means that within a few years there must be an even more drastic sorting out of the ranks of the war-built ship. The following table lists some of 1960's sales of standard type ships.

War-built Steamships

Name	dwt	Built	Sellers	Buyers	Price
Apollonia	10,790	1944	Panamanian	Greek	£95,000
Giarda	10,860	1940	Italian	Lebanese	£81,000
Nicolas	10,840	1943	Liberian	Greek	£102,500
Archipelago	10,750	1944	Liberian	Liberian	£80,000
Cepheus	10,330	1943	Liberian	Panamanian	£90,000
Cambray	10,310	1944	British	Panamanian	£87,500
Chandler	10,246	1944	British	Panamanian	£85,000
Culross	10,081	1946	British	Greek	£69,500
Bice Costa	10,854	1943	Italian	Liberian	£69,000
Jackie Hause ...	10,478	1944	American	American	$160,500
Andrea Parodi ...	10,874	1944	Italian	Polish	£115,000
Isa Parodi	10,874	1942	Italian	Polish	£105,000
Nantes	10,271	1943	French	Italian	£80,000
Hyeres	10,820	1943	French	Italian	£86,500
Agioi Victores ...	10,850	1943	Liberian	Greek	£100,000
Cottrell	10,310	1944	British	Italian	£85,000
Leuvekerk	10,394	1943	Dutch	Greek	£97,500
Amstelland	10,765	1944	Dutch	Greek	£115,000
Clervaux	10,155	1941	Belgian	Greek	£55,000
Briancon	10,427	1943	French	Greek	£85,000
Saint Tropez	10,815	1943	French	Greek	£88,000
Ingleton	10,000	1942	British	Greek	£80,000
Middle River	10,874	1944	Liberian	Greek	£105,000
Skjelnes	10,800	1943	Norwegian	Greek	£88,000

That there should, during a year when freights were not so promising, have been such a sustained interest in standard type ships was perhaps surprising. One theory advanced about why buyers should pay perhaps £100,000 for such a ship for trading was that at such a price, with survey passed, the buyers would be ensured of four years' trading, apart from accident, followed by a further year if an extension of class was obtained. For a ship bought at such a price it is perhaps not too much to hope that she would recover her cost for her owner in four years and he would not have to be writing much off her at that price. At the end of her survey period he will at least have the ship's breaking value to look forward to—although what scrap value will be four or five years hence is always a gamble.

It is easily appreciated that to buy a £1 mn newbuilding today means that, even though the ship has a much longer life ahead of her, the owners have to put aside a great portion of her earnings against her first cost, and the profit margin is consequently reduced. It is perhaps a sad commentary when it can be theorised that an old ship can prove a better short-term proposition than a new ship can in the long term, but nevertheless it does help to understand why buyers are available for standard ships.

If there has been such interest in standard steamers, then standard war-built motorships have also held their attractions, for they are obviously more economic in certain circumstances. The main difficulty is that there are not the same number of them available as there are of their steam counterparts. However, 1960 has seen several such ships changing hands at good prices. Value was generally well maintained during the year, and the following table lists some of the ships in this category which changed hands. The *Sally Stove* and *Gregers Gram* were converted Liberty steamers, and no doubt fetched higher prices because their machinery was more modern. Prices are again subject to size, age and survey position.

War-built Motorships

Name	dwt	Built	Sellers	Buyers	Price
Homer City	9,466	1944	British	Hong Kong	£170,000
Hughli	9,770	1943	British	Hong Kong	£134,000
Houston City ...	10,410	1942	British	British	£140,000
Sally Stove	10,650	1944	Norwegian	Panamanian	£170,000
Gregers Gram ...	10,590	1943	Norwegian	Panamanian	£166,000
Parkgate	10,070	1945	British	Greek	£180,000
Chulmleigh	9,380	1946	British	British	£150,000

If war-built motorships brought such relatively good prices for trading, then obviously what modern tonnage was available has generally maintained a high value. That is not to say that such modern ship values now are anything like what they would have been had freight rates been much better, for after all it is always clear that the ups and downs of the freight market bear a considerable measure of the reason for ship value fluctuations.

One might well ask why any owner of a modern ship should want to sell at a time when prospects in freights are looking better, but there are always sellers. In fact it is said with a certain grain of truth that all shipowners are sellers at the right price. That is not perhaps to be taken too literally, for one can hardly visualise—to pose an example—that Cunard would sell such a ship as the *Queen Elizabeth* at any price. The saying is rather more in keeping with the cargo trades, but is of course subject to the availability of buyers with high priced ideas.

In this connection it is often said that "such and such is not on the market, but if a good offer comes along the owners might sell", and when it comes out that a certain ship has been sold which was never generally offered, the answer is sometimes that "we received a very good unsolicited offer, and decided to accept." This is no more than good business, for if a ship can be spared, and the offer is right, an owner would be foolish to let the opportunity of turning a ship into hard cash pass.

In many cases, however, owners have to let ships go at prices which are hardly attractive, and in some cases ships are sold because their owners have newbuilding commitments which have to be paid for and they presumably feel that they should let some of their older ships go to provide the instalments for an even more modern vessel, which presumably will be a better trading proposition.

Of considerable interest among the modern ships sold during the year was the *La Hacienda*, which went to the Nigerian National Line for about £500,000 in August. She was the fifth modern vessel to be bought by the company in the last year or so and in all it has now spent some £2¼ mn on building up its fleet.

Apart from the various ships mentioned in the following table of modern vessels sold, there have been various other such ships involved in transactions which are listed

in other tables which follow, later in this report. Several such ships were involved in deals to Pakistan and India, while the *Hoegh Silvermoon*, built in 1947, went to Hong Kong trading buyers for £310,000. The following table lists some of the modern vessels sold during the year:—

Modern

Name	dwt	Built	Sellers	Buyers	Price
Pacific Conqueror ...	15,000	1957	U.S.	Greek	£752,000
Halland	9,225	1945	Swedish	Sweden	£255,000
Fanny Scarlett ...	4,930	1958	Danish	French	£450,000
Byfjord	3,840	1948	Norwegian	Panamanian	£82,500
Sorteklint	2,500	1958	Danish	Swedish	£235,000
Chateau Petrus ...	2,639	1949	French	Tunisian	£72,000
Pacific Pioneer ...	14,722	1956	By auction	Liberian	$1,850,000
Marilu	11,000	1957	Italian	French	£800,000
La Hacienda	10,063	1953	British	Nigerian	£500,000
Mica	3,125	1948	Norwegian	Norwegian	£105,000
Fernebo	2,190	1945	Swedish	British	£87,000
Inland	1,507	1950	Swedish	Canadian	£105,000
Despina C.	10,750	1956	Liberian	British	£575,000
Cetus	3,812	1949	Norwegian	Norwegian	£110,000
Manchester Prospector	2,350	1948	British	Greek	£65,000
Colombia	2,500	1947	Colombian	Swedish	£70,000

Sales to Hong Kong during the year provided a lot of interest, for there has been a particular movement of war-built tonnage to buyers in the British colony. The obvious point in their favour is presumably that such ships can be operated more economically from the Eastern port. This may be due to many of them having local crews and operating in Eastern trades. There are many veteran ships working out East and making profits for their owners, so that compared with such aged vessels a standard wartime vessel is no doubt a very much better prospect. Hong Kong owners are still interested in older ships for their Eastern trading fleets, but by far the majority of their purchases during 1960 were of standard types, and the prices paid generally kept a very good level.

Hong Kong

Name	dwt	Built	Sellers	Price
Millais	9,655	1944	British	£100,000
Cabano	10,190	1943	British	£83,000
Poplar Hill	10,384	1944	British	£83,000
Harrow Hill	10,300	1943	British	£84,500
Alendi Hill	10,230	1944	British	£90,000
Capitaine Paret	10,300	1943	Belgian	£87,500
Hudson River	10,000	1942	Liberian	£82,500
Sunjewel	10,713	1945	British	£75,000
Sunmount	10,713	1945	British	£72,500
Teviot	10,129	1944	British	£76,500
Stanrealm	10,397	1944	British	£90,000
Canopus	10,721	1944	Panamanian	£85,000
City of Leeds	10,657	1944	British	£80,000
Hermiston	8,120	1939	British	£80,000
Svarten	9,250	1929	Swedish	£60,000
Aspen (m.v.)	9,100	1936	Swedish	£87,500
Teespool	10,490	1942	British	£104,000
Nurani	8,325	1941	British	£85,000
Merton	8,200	1941	British	£97,500
Cape St. David	9,744	1941	British	£82,500
Hoegh Silvermoon (m.v.)	8,100	1947	Norwegian	£310,000
Rio Orinoco (m.v.)	6,007	1945	Venezuelan	$300,000

In addition to the usual variables of tonnage, age and survey, the prices realised by Hong Kong purchases have also been subject to the question of delivery either in Europe or at Hong Kong. Those which have made the trip out East to give delivery have commanded an additional premium.

Chinese Communist Buyers

There has also been considerable interest by Chinese Communist buyers. During the year they bought the British flag Liberty steamer *Edenbank* for £115,000; she carries 10,850 dwt, and was built in 1943. Chinese mainland buyers also bought the *Mastro Stelios*, another 10,000-dwt standard type, dating from 1941. She was sold by Greek buyers for £117,500, which price is of interest in that it was the highest paid for a standard type during the year. This price was obviously influenced by her having given delivery Shanghai which involved additional repatriation expenses, and in addition there were a number of other standard ships which changed hands without the price being reported. However, there was no evidence that any such ship had realised as much as the *Mastro Stelios*, although several fetched £115,000.

Chinese buyers also took several other ships, including the 841-dwt Hong Kong owned motor tanker *Grosvenor Court*, the 1,200-dwt Norwegian steamer *Sigurd Jarl*, built 1942, and the 10,330-dwt steamer *Aegean Sea*, completed in 1943, but no price details came to light.

The accompanying table lists some of the sales to Hong Kong buyers, and many of the ships listed went under the Panamanian flag.

Tanker Sales

The tanker market provided a lot of interest during 1960 and in particular there was ample evidence, at a time when freight rates in the tanker trades have been at rock bottom levels, that a tanker with a transferable time charter at a remunerative rate is assured of lots of interest from buyers. Early in 1960 H. E. Moss & Co paid £1.4 mn for the 19,000-dwt motor tanker *Haukefjell*, which had been launched at Sunderland for Norwegian owners. She had cost about £1.2 mn to build and the reason for the premium was not hard to find, for she had a five-years time charter to BP at 26s per dwt per month. She was renamed *Luxor*.

At about the same time the 25,800-dwt motor tanker *Snestad*, completing at the Eriksberg shipyard at Gothenberg, was reported sold to the Naess-Denholm concern for £2,140,000 and she also had a good time charter. She had also been under construction for Norwegian owners, and she was renamed *Naess Clansman*. Some months later the 24,300-dwt motor tanker *Bello*, completed at Malmo in 1951, was sold from one Norwegian owner to another for £937,500, and this included a time charter until early 1964 at Fl15.42, or about 30s per dwt. The *Bello* is to give delivery this month.

Bigger deals were pending, however, and during September came news that a 45,000-dwt turbine tanker building in a German yard for Norwegian account had been sold to other Norwegians for over £4 mn including a seven-years time charter to Dutch Esso at 30s 6d per ton. The ship was building in two halves and one half had already been launched under the name *Bergebig*. This ship represented at that time the biggest tanker sale arranged in terms of both price and size. Early in December however there was another big tanker transaction reported, after a spell of rumour which lasted for several weeks. This involved the 33,000-dwt Swedish turbine tanker *Soya-Elizabeth* which was sold to the Naess-Denholm group. This ship has a charter to Caltex until October 1963 at 26s 6d, and then a five-years charter to Shell at 29s, and the new owners decided to rename the ship *Naess Seafarer*. The price paid was £2,600,000.

A Greek Purchase

In February Greek buyers paid £680,000 for the 18,000-dwt turbine tanker *Western Clipper*, built in a German yard for Swedish interests and completed in 1958, which had been idle in German waters ever since. Noisy gearing was said to have caused her original owners to decline the ship, but otherwise she was a very good type of vessel, and she was said to have cost over £1 mn to build, so she provided the Greek buyer with a bargain. As the price paid for this ship makes clear, she was of course sold charter free.

The following table lists some of the tankers which have changed hands during 1960, and the list is by no means exhaustive for it has been surprising that with freights so low there should have been such interest in tankers. Apart from the vessels with charters attached, there have been many sales of vessels with charter-free delivery, but in these cases prices have been low. For the buyer who is able to sit back and await the chance of recouping his expenditure, however, there was ample opportunity to buy good tankers cheaply.

Tankers

Name	dwt	Built	Sellers	Buyers	Price
Daghild ...	15,910	1948	Norwegian	Panamanian	£185,000
Western Clipper ...	18,000	1958	German	Greek	£680,000
Cassian Sailor ...	14,760	1942	Panamanian	Pakistani	£100,000
Haukefjell	19,000	1960	Norwegian	British	£1,400,000
Purfina Congo ...	15,980	1950	Belgian	Norwegian	£310,000
Vestfoss	12,301	1949	Norwegian	Norwegian	£177,500
Lussino	2,963	1955	Italian	French	£200,000
Hammersborg (T2) ...	16,633	1944	Norwegian	Liberian	£757,000
Eurycleia	24,232	1952	Liberian	Formosan	£425,000
Hoegh Rider	15,135	1952	Norwegian	Bermudan	£275,000
Gilda	16,225	1945	Norwegian	Egyptian	£145,000
Belle	24,325	1951	Norwegian	Norwegian	£937,000
Snestad	25,800	1960	Norwegian	Bermudan	£2,140,000
Margit Reuter ...	12,760	1945	Swedish	Bulgarian	£170,000
Anne	4,275	1952	Norwegian	Norwegian	£240,000
Olav Ringdal jr. ...	15,700	1948	Norwegian	Finnish	£190,500
Ocean Clipper ...	15,810	1953	Swedish	Greek	£295,000
O. A. Knudsen ...	17,310	1951	Norwegian	Finnish	£270,000
Bergebig	45,500	Building	Norwegian	Norwegian	£4,000,000
Ras al Ardh	26,878	1949	Bahamas	Greek	£400,000
Jahra	28,336	1949	Bahamas	Greek	£400,000
Marianne	18,100	1953	Swedish	Norwegian	£400,000
Melanie	12,970	1950	Norwegian	Finnish	£170,000
Salamis	18,800	1954	Norwegian	Italian	£390,000

The year 1960 has been one with many surprises as far as shipbreaking transactions are concerned. The main feature of worldwide activity in scrap tonnage was the block purchases by BISCO, which included a group of 20 Shell tankers, seven BP tankers, and ten Liberty-type steamers from one of the American reserve fleets. In addition their acquisitions have included many other ships, of all shapes and sizes, including the battleship *Vanguard* and the Cunard motor liner *Britannic* right down the scale to many trawlers and other small craft. Other big ships bought by the Corporation included the *Empress of France*, the *Captain Cook* and the *Highland Monarch*.

Further purchases by BISCO

An interesting point about many of the ships bought by BISCO during the year was that they were towed across the Atlantic for demolition. This is not the first time that ships from abroad have attracted the Corporation's attention, but in recent years such deals have been fewer, while they have concentrated rather more on the demolition of over-age warships, which have in some cases been towed from Malta. In neither of the bulk tanker deals was the price paid by BISCO reported, but this has become a common thing that it is very seldom that it is possible to report prices paid by the Corporation. During 1960 one or two prices have come to light and these are included in the table of shipbreaking sales which follows.

Following the three bulk sales to BISCO, it was confidently felt that they would then disappear from the market, and get down to the task of breaking up the many ships which they had available for allocation. This, however, was not the case and early in December they bought the *Britannic* after there had been rumours of the ship being likely to go to Japanese breakers. It might well have been felt that this big ship purchase was specifically to keep a big shipbreaking yard busy on a big vessel, as opposed to many small ships, but soon even this supposition was proved wrong for they bought the 11,000-dwt *Karamea* for about £105,000, the smaller motor vessel *Sansu* for £35,000, and the Ellerman steamer *City of Lyons* for what was reported as £13 per ton on the light displacement, and then the *Empress of France* for demolition at Newport, Mon.

Tankers Broken Up

Earlier in the year interest was aroused by the purchase of a group of four Shell tankers, including the *Limatula* which dated from as recently as 1950. She was undoubtedly the most modern tanker sold for scrap, and it was an unfortunate reflection on the state of the tanker market that such a ship should end her days so soon in a scrap yard. In addition to these four tankers and the 20 vessels previously mentioned, Shell have also been active out East, selling various vessels to Hong Kong and Japanese breakers. Their attitude was summed up by Mr H. Wilkinson, chairman of Shell Tankers Ltd, when he said the disposal of older and less economic vessels would in part be a solution to the problems facing the tanker market.

Hong Kong and Japanese breakers were again active and the largest vessel disposed of to Japanese breakers was the 20,000-grt motor liner *Winchester Castle*, which went for £315,000 with delivery at a Japanese port. At the same time a Hong Kong firm paid about £135,000 for the 11,346-grt *Tyndareus*, a Blue Funnel liner which had been engaged in the pilgrim trades.

On the American market there was a large-scale sort-out of old standard ships from the reserve fleets, and while many were broken up in American yards many others went to Japan, as did various over-age aircraft carriers from the U.S. Navy. Such ships also went to breakers in Holland, Germany, Belgium and Spain. The following table lists some of the breaking up sales of 1960, many others being left out in the absence of price details.

Breaking Up

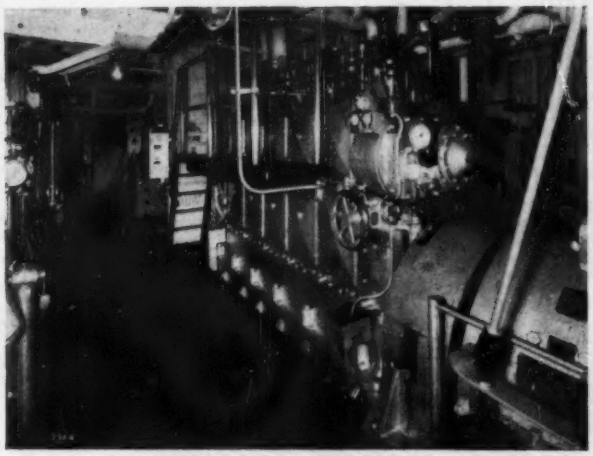
Name	grt	Built	Sellers	Buyers	Price
Silver River	6,118	1938	Liberian	Hong Kong	£48,500
Fair Ryan	9,935	1943	British	Japanese	£97,500
Aeolia	4,249	1918	Greek	Japanese	£68,000
Yenangyeung ...	5,938	1937	British	Hong Kong	£53,000
Koala	4,447	1926	Swedish	Swedish	£30,000
Belgian Gulf	8,236	1929	Belgian	Belgian	£71,000
Aslaug Rogenaes ...	9,430	1939	Norwegian	British	£62,000
Orion	2,034	1930	Dutch	Belgian	£42,000
Westbrook	8,137	1942	British	British	£58,000
San Francesco ...	7,111	1943	Italian	Hong Kong	£63,000
Islander	1,598	1929	British	Hong Kong	£25,500
Transcarib	5,949	1929	Liberian	Japanese	$220,000
Abaco Queen ...	1,386	1943	American	American	$77,778
Selvistan	5,587	1928	British	Japanese	£62,000
Dimos	4,824	1927	Lebanese	Japanese	£61,000
Langton Grange ...	7,071	1942	British	Hong Kong	£64,000
Clan Mackenzie ...	7,025	1942	British	Hong Kong	£68,000
Hroor	1,399	1923	Danish	Belgian	£17,500
Aghios Spyridon ...	7,214	1944	Panamanian	British	£48,000
Mapledore	4,564	1930	British	British	£40,000
Globe Trader ...	7,981	1939	Norwegian	British	£64,000
Noemi	4,832	1936	Costa Rican	Japanese	£65,000
Phorkyss	7,618	1943	Liberian	Japanese	£73,000
Sze Feng ...	5,025	1946	Hong Kong	Hong Kong	£70,000
Sansu	4,174	1939	British	British	£35,000
Karamea	11,006	1928	British	British	£105,000
Bonn	1,191	1928	Norwegian	Norwegian	£14,750
Daronia	8,139	1939	British	Hong Kong	£80,000
Katharina Dorothea Fritzen	6,365	1929	German	Japanese	£70,000
Esso Buffalo	11,488	1943	Panamanian	Italian	$230,000
Esso Pittsburgh ...	11,396	1943	Panamanian	Yugoslav	$265,000

Such then has been the sale and purchase market in 1960. In general the end of the year was showing rather better, or should one say more encouraging, signs for the future, and if present trends follow through it seems evident that 1961 will see secondhand ship values on the upgrade.

SOUND ABSORBING MATERIALS

Sound absorbing materials are being used increasingly for the control of the acoustical properties of concert halls and auditoria as well as noise reduction in offices, restaurants and factories etc. Measurements of the sound absorption coefficients of suitable materials have been carried out for a number of years at the National Physical Laboratory. They have included most of the proprietary materials used in Britain as well as forms of special treatment and mounting. The results of these investigations are now made available for the benefit of users, manufacturers, architects and others concerned with the application and properties of sound absorbents. They have been brought together in a booklet entitled *Sound Absorbing Materials*, by E. J. Evans and E. N. Bazley (HMSO, 3s). The main section of the booklet consists of tables of the absorption coefficients of over 300 materials measured at the Laboratory. Both the materials and the method of mounting employed are described. The materials are classified broadly according to their physical characteristics, those of the same acoustical type being grouped together. The tables are accompanied by a discussion of the results. Recent developments in the design of sound absorbent materials are described as well as the various types and the physical processes involved.

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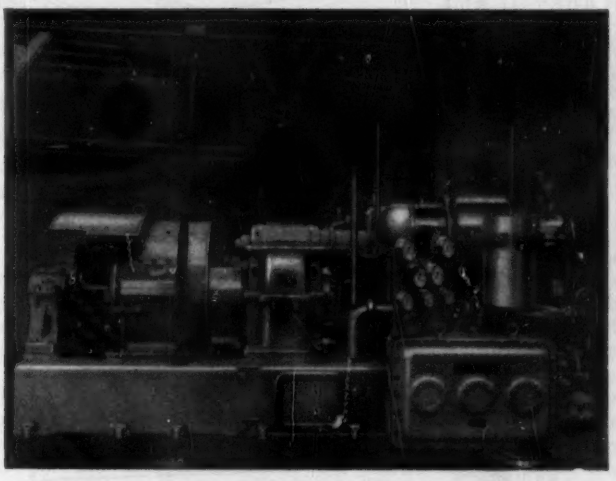
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Air Transport Section

Air Charter Market

REVIEW OF THE YEAR

By a Special Correspondent

THE 1960s did not begin well for the air charter market, nor do the prospects for the remainder of the decade look so very good. During the past year the market was presented with some hard facts for it to accept and digest, and perhaps provoked the Airbrokers' Association to issue about the middle of the year its pamphlet *Freedom of the Air*, protesting about their plight, and not without justification.

Among the problems were those associated with the introduction of the new Civil Aviation (Licensing) Act. This Act is providing new outlets for the resources of British independent air companies by allowing them to operate scheduled services more freely in competition with the State air corporations. It is understandable, therefore, that the independents should divert some of their energies away from the charter field to the seemingly more attractive scheduled service operations. At the same time the new Act, which is expected to become effective from 30 March 1961, makes it necessary to obtain air service licences for practically all forms of commercial charter work.

Traffic Lost to Scheduled Airlines

In addition 1960 saw the implementation of still more special low fares, including "group" fares, on some scheduled services, particularly on routes within the Commonwealth. The new low rates can often compete with charter rates, and as a result some of the ships' crew traffic, one of the mainstays of the charter market, has been lost to scheduled airlines. 1960 was also the first full year of the jet age, with larger and faster aircraft being placed at the disposal of national airlines all over the world. Not only have the national airlines had to find more passengers to fill these greater-capacity jets, but they have also been looking round for employment for their displaced piston-engined equipment. As a result the scheduled airlines have been taking greater interest in charter business, much of which has bypassed the charter market.

As if these factors were not enough for the charter market to contend with in one year, holidaying Britons also decided to confuse the situation. The travel trade was predicting a boom year for inclusive tours to the Continent in 1960, but unfortunately the boom was several decibels lower than anticipated. As it happened, air transport captured a certain amount of what holiday traffic there was from the rail and sea services but, nevertheless, the air flow of passengers just did not reach the level that operators had been led to expect. The inclusive tours section was not the only section of the market to disappoint: the Far East route, with its substantial ships' crew traffic, also failed to fulfil all that was expected of it.

An indication of the air charter market's condition in 1960 was provided in the latest annual report of the British Independent Air Transport Association, published in November. Although this report dealt with the period from 1 April 1959 to 30 March 1960, and therefore only covered the first quarter of last year, it does illustrate the trend that was developing. Although most activities of BIATA airlines had shown improvements, particularly in the case of scheduled services, results of charter and contract operations were generally poorer than previous years. Civilian passengers carried, for example, dropped by as much as 48 per cent—173,927 as against 331,717—from the previous year (taken up to June 30). This considerable decrease was due almost entirely to the end or completion of certain overseas contracts, where local or national airlines have taken over these operations.

The BIATA report commented: "These are perhaps inevitable developments as increasing capacity becomes available in various ways, but there is no reason to suppose that air charter and contract operations will not continue to play a role in air transport progress and to fulfil special demands and needs which could not be met by other means."

The charter market was not, of course, in a continual state of depression during the whole of 1960. There were periods of heightened activity, and the busy summer months again produced a state where shortage of aircraft induced the brokers' biggest headache. It is an unfortunate aspect of the air charter market that its busiest times often arise as the result of somebody else's misfortune: this was the case in 1960. The civil disturbances in the Belgian Congo, the seamen's strike and the strike affecting the shipping services to Ireland, all helped to produce extra business for air operators and brokers.

As 1960 opened a reasonably strong tone pervaded the market, but unfortunately this strength was short-lived, and by the end of January conditions were generally weak. It was in the first month of the year that comment was made about the changing attitude of some shipowners in choosing Chinese seamen instead of Lascars when crewing at Hong Kong. This meant that the frequent shipments by air of Lascar seamen between Bombay and Hong Kong diminished.

Brief Bursts of Activity

The weak market conditions continued through February and March, although there were occasional brief bursts of activity. In the middle of February, for example, there were several prompt fixtures reported for the emergency movement of ships' spares. Earlier in the month the threatened rail strike brought forth a flood of inquiry, mainly for internal flights with twin-engined equipment, but as the strike never materialised the potential charterers disappeared from the market. In March the unusual movement of a ship's crew (25 seamen) from Athens to Honolulu, via London, served as good proof of the value of the London air charter market. For this particular charter a Viking was used from Athens to London and a DC6C from London to Honolulu.

At the beginning of April inquiry began to flow more quickly on to the market, but with the summer season impending aircraft were in short supply: inquiry on the North Atlantic route for holiday passenger traffic reached a good volume at this stage. By the end of the month things had quietened down considerably, and there was an embarrassing shortage of twin-engined aircraft for prompt movements. After an extremely quiet start to May—some brokers complained of a lack of interest in the market unknown for years—conditions in the Far East section at least brightened somewhat, although in no sections during the month was activity intense.

During the first half of June there was one of the year's few periods of comparatively prolonged activity, a great deal of which was in the Far East section. It was also in June that the Airbrokers' Association issued the *Freedom of the Air* pamphlet. The basic contention of this pamphlet was that international government regulations

Air Transport Section

formulated to help maintain a sense of order in the world's scheduled air services were being wrongly applied to *ad hoc* charter flights, and so restricting development.

July produced the Congo disturbances and the strike on the Irish Sea shipping services, but otherwise the month was a humdrum one, while the first part of August was an extremely frustrating period for brokers, with heavy demand for four-engined aircraft, particularly on the Far East route, but no supply. It was in early August that the seamen's strike broke, and this did not help the situation. For the latter part of the year things were rather patchy, with no prolonged periods of either intense activity or depression. One of the biggest changes to occur in the last quarter took place during the third week of October, when there was a complete reversal of bargaining positions in the Far East section, and operators had to accept reductions of as much as 25 per cent on movements out of Hong Kong.

As for 1961: although probably no broker on the air charter market is expecting great things of the year, there is at least not the same degree of pessimism that existed in the spring of last year.

British Air Transport in 1960

A GOOD YEAR FOR COMMERCIAL AVIATION

By D. M. Brace

DURING 1960 world aviation continued to expand at a fast rate. When the figures for the year's operations are collated it is likely they will show that traffic increased at about the customary annual rate of 15 per cent. But that growth brought with it associated problems, not least among them air traffic control. The shortcomings of this aspect of aviation were brought sharply—and tragically—into focus towards the end of the year when two airliners collided over New York with the loss of nearly 140 lives.

Last year saw considerable discussion on this all-important subject of the control of aircraft movements. A few weeks earlier a R.A.F. Comet in which the Queen and the Duke of Edinburgh were flying was involved in a near miss with a German fighter. This incident sparked off a welter of criticism against the existing control facilities and only two days after the New York accident the Minister of Aviation announced that agreement had been reached for the setting up of a unified European air traffic control organisation. It seems, however, that unification is not likely to be the entire answer to the problem.

Air Traffic Control

As air transport grows, so the number of movements increases. In 1959, for instance, air traffic movements at United Kingdom aerodromes were close on 360,000. With the introduction of bigger aircraft the number of aircraft movements does not, of course, go up at the same rate as the number of passengers, but there are, nevertheless, more aircraft entering service each year. Britain is particularly fortunate in possessing one of the best air traffic control systems in the world. Over the past few years I have spoken to a number of senior airline captains on this problem and all have said that they would sooner land at London Airport, particularly in bad weather, than at any other airport in the world.

It is not easy to see a solution to this air traffic control problem, unless it be in the greater use of electronic aids, such as computers, which should be capable of automatically giving warning of impending danger. But it is not only in the air that the problems of increased activity are being encountered. When I visited New York last summer I saw ten airliners waiting in a queue to take off from Idlewild Airport. And a few days previously a BOAC Comet had been kept waiting for over an hour to take off—so long, in fact, that it eventually had to return to the terminal buildings to take on more fuel.

In a year in which so much that has been exciting and new has happened in commercial aviation it is unfortunate that I should have had to start a review by referring to the worst accident in the history of aviation, but I believe that the air traffic control problems confronting the industry cannot be overstressed. Unless something is done within the next few years to achieve the speedy and safe movement of aircraft the whole commercial aviation industry could conceivably come to a halt. Britain's overcrowded roads and the huge traffic jams must not—in fact, cannot—be allowed to repeat themselves in the air.

The year just ended was the first in which the big jet airliners had been in general service with nearly all the world's major airlines. They have undoubtedly proved a success, and in spite of some reports that might have given a contrary impression, they have been remarkably trouble-free. On practically every route and service on which they have been introduced increases in traffic have been reported. Already the jet is beginning to find its way on to the short haul routes, and it seems that by the mid-1960s nearly all air travel over routes of more than 100 miles will be by this type of aircraft.

How did British commercial aviation fare in 1960? At the time of writing, no announcements have been made of the year's results, but there can be little doubt that all in all the companies, both State owned and independent, did better in 1960 than in any previous 12 months. Traffic continued to expand; new aircraft were introduced into service; new routes and services were opened up—the pattern was basically the same as in previous years.

British Overseas Airways Corporation

For the British Overseas Airways Corporation the main event of the year was the introduction of its fleet of 15 Boeing 707 jet airliners. The corporation has not been particularly lucky with its aircraft, and the 707 initially proved no exception. The Air Registration Board refused to accept it in its original form and it was only after a number of modifications, and a delay of four months, that the first aircraft was delivered. It is, however, of interest to note that the Boeing company has subsequently made standard the modifications insisted on by the A.R.B., and is also suggesting to airlines the modification of aircraft delivered before the BOAC machines.

The corporation's annual report for the year to the end of March 1960 showed that BOAC had made a profit, before interest on capital, on its own operations, of over £4 million—the largest in BOAC's history. This figure was reduced to £277,813 after payment of interest, a small amount, but nonetheless encouraging, after BOAC had spent so many years "in the red." However, the corporation's associated companies recorded a loss of £1.1 mn (a considerable improvement on the previous year's loss of £3.1 mn), which meant that BOAC eventually showed a deficit of £833,795 (against £5,179,420 the year before). At the beginning of 1960 the last of the corporation's fleet of 19 Comet 4 airliners was delivered, and 1960 saw these machines operating over practically the whole of BOAC's

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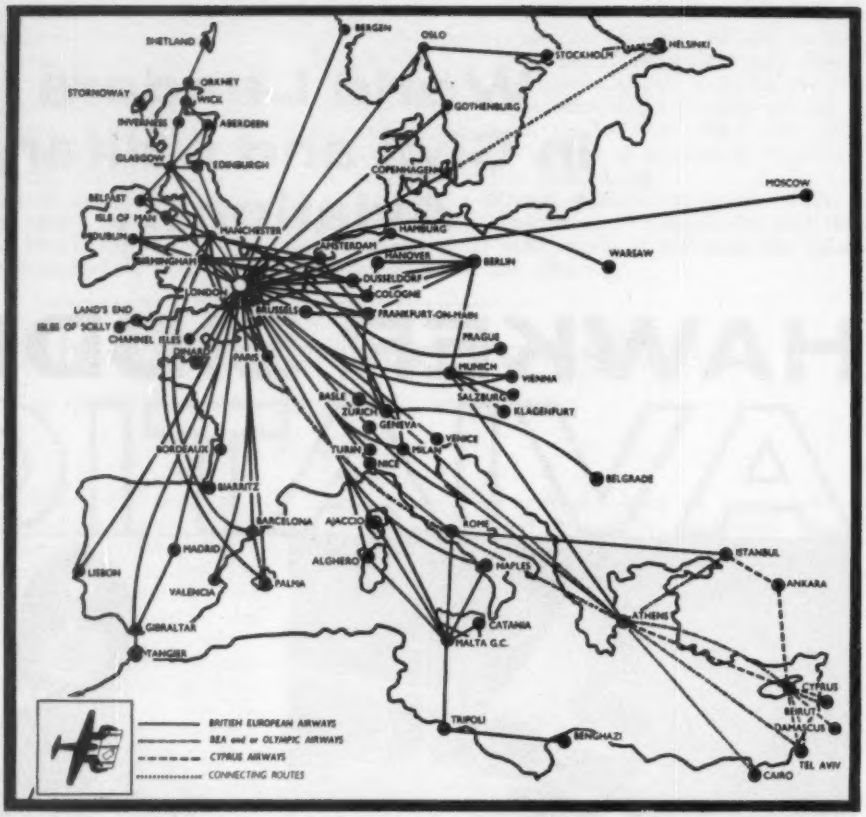


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vast network of routes. So extensively are these machines now being used that the corporation is achieving a daily utilisation rate of 10½ hours—well over 3,000 hours per aircraft each year.

During the financial year BOAC carried 587,372 passengers, an increase of nearly 25 per cent on the previous year, and cargo showed an increase of just under 2,000 tons at a total of 10,413 tons. With the popularity of jet and turbo-prop travel keeping the fleets of Britannias, Comets and Boeing 707s fully employed, BOAC ran into the problem of what to do with its ten DC-7C aircraft bought less than five years ago. Though still "full of flying," little employment could be found for these piston-engined machines in a passenger-carrying role, and towards the end of 1960 BOAC decided to have some of them converted for cargo work. In December the corporation moved into a sphere of commercial aviation in which it had never previously ventured when it started a North Atlantic all-cargo service using these converted Douglas machines. All the indications are that the coming year will see the airlines making an attack to capture an increasing share of cargo traffic, and undoubtedly BOAC intends to be in a position to take some of the cargo that is offering. Later this month the world's airlines will be assembling at a special meeting of the International Air Transport Association, when the development of air cargo is to be the main subject for discussion. The outcome of that meeting is confidently expected to be the announcement of big reductions in cargo rates.

During 1960 BOAC continued to regain much of the ground it had previously lost on the North Atlantic, so far as passengers were concerned. First with the Comets and then with the 707s the frequency of services was gradually stepped up. Now that the corporation has a much healthier aircraft position than has been the case for many years it is possible to open up new routes. Next month will see BOAC's first "over the Pole" service, when Boeing 707s start flying regularly between London and Los Angeles.

Lower Fares

Probably the announcement that gave BOAC the greatest satisfaction last year was that by IATA of lower fares on many of the world's trunk routes. The corporation had been pressing for the widespread adoption of low fares at several IATA conferences, but had been strongly resisted by a number of foreign companies. Eventually in March 1960 agreement was reached. One of the most revolutionary of decisions was that to introduce a special winter excursion rate between London and New York of £114 for propeller-driven aircraft, and £125 for jets. This meant that it would be possible to fly across the Atlantic at a cheaper rate than nearly all shipping companies were offering. Success with the new rate, which came into operation on October 1, was immediate, and it seems that it has gone a considerable way to overcoming the winter "trough" on this route.

British European Airways faced one major setback in 1960—the non-delivery of its Vickers Vanguard fleet—but for the rest the corporation had another good year. The annual report showed that BEA had, in the year to 31 March 1960, the most successful year in the corporation's 14-years history. Traffic increased by 19 per cent and a profit of £2,086,078 was made after allowing for payment of interest. This was the sixth successive year in which BEA had made a profit.

Early in the year BEA introduced Comets into service. This was the first occasion on which BEA had operated pure jet aircraft, and so pleased was the corporation with these magnificent de Havilland aircraft that it increased the order from the original contract for seven; then it again raised the order, and then yet again. Now it is scheduled to have 14 Comets. But if the Comet proved a success for BEA the Vickers Vanguard turned out to be a disappointment. The corporation had planned to use a number of these machines (it has 20 Vanguards on order) during the peak summer season. In May, just a few days before delivery, a fault was discovered in the Rolls-Royce Tyne turbo-prop engines. It was almost unbelievable that the famous R.R. firm should have produced an engine that was even slightly less than perfect, but the Tyne's troubles proved difficult to overcome, and the corporation was forced to do without its Vanguards throughout the whole of the summer. In fact, it was not until early December that the first machine was handed over; it was used on a few services during the Christmas holiday rush period, but it will not be until next March that the Vanguard fleet is placed on scheduled service.

Short-Haul Jet Airliners

It may well be that this aircraft will be the last turbo-prop airliner to enter large-scale service with a major airline. The move towards jet travel is gaining impetus, even over the short-haul routes such as BEA operate. In about three year's time the corporation will start to receive a jet airliner specially tailored to its requirements, the de Havilland Trident, a 600-mph machine powered by three Rolls-Royce Spey engines situated in the tail. The first Trident is due to make its maiden flight this year, and the fleet of 24 machines are to start service in 1963. During the year covered by the report BEA carried 3,289,606 passengers, which was a 16 per cent rise on the previous year, and cargo traffic rose by over 30 per cent, with the airline lifting 36,395 tons.

In a comment on the future the report stated: "We must stress that our future plans are based upon the expectation that BEA will be allowed to continue with its planned expansion, and will not have its operations curtailed as a result of decisions made by the new Air Transport Licensing Board." This new board will start operating within the next few weeks, under the chairmanship of Lord Terrington, who has hitherto been chairman of the Air Transport Advisory Council. The board will operate in much the same way as the council, but its terms of reference will be wider. It is anticipated that it will give the independent companies greater opportunities of expansion, particularly on overseas routes, than they have had in the past. Both corporations have already voiced their fears that traffic will be diverted from them, with consequent effects on their earning power. It is perhaps of interest to note what the independent operators had to say on this point in their annual report. "A new phase is beginning which, at the moment, is uncertain and unclear. The independent airlines, however, firmly believe that they have a greater contribution to make and therefore look forward to being able to make that contribution." Obviously the views of the independents and the corporations are at some variance.

Independent Air Transport

The report of the British Independent Air Transport Association gives an indication of the changing pattern of these companies' operations. In the immediate postwar years they were almost exclusively engaged on charter work. Then, following the return to power of a Conservative Government, came an expansion of air trooping work, and a greater opportunity to participate in scheduled operations; the car ferry services and inclusive tours are typical of the latter. In the year to March 31 last only 293,511 passengers were carried on charter and contract operations (including 119,584 on air trooping work), compared with nearly 1,000,000 on scheduled services. It seems that this gulf between the two types of operation is likely to widen if, as is anticipated, the companies are given by

the Licensing Board more chances to operate scheduled services. As would be expected, the vehicle ferry flights account for the largest number of passengers—291,000 in the year covered by the report. On the services to the Channel Islands 217,000 were carried; 95,000 to and from the Isle of Man; 167,000 on inclusive tours, and 275,000 on scheduled international services.

Last year saw two major changes among the independents. Early in the year Hunting-Clan Air Transport Ltd and Airwork Ltd (they had been jointly operating colonial-coach services to Africa for some years) merged, and so became the biggest independently owned group in British commercial aviation. The name chosen for the new combine was British United Airways.

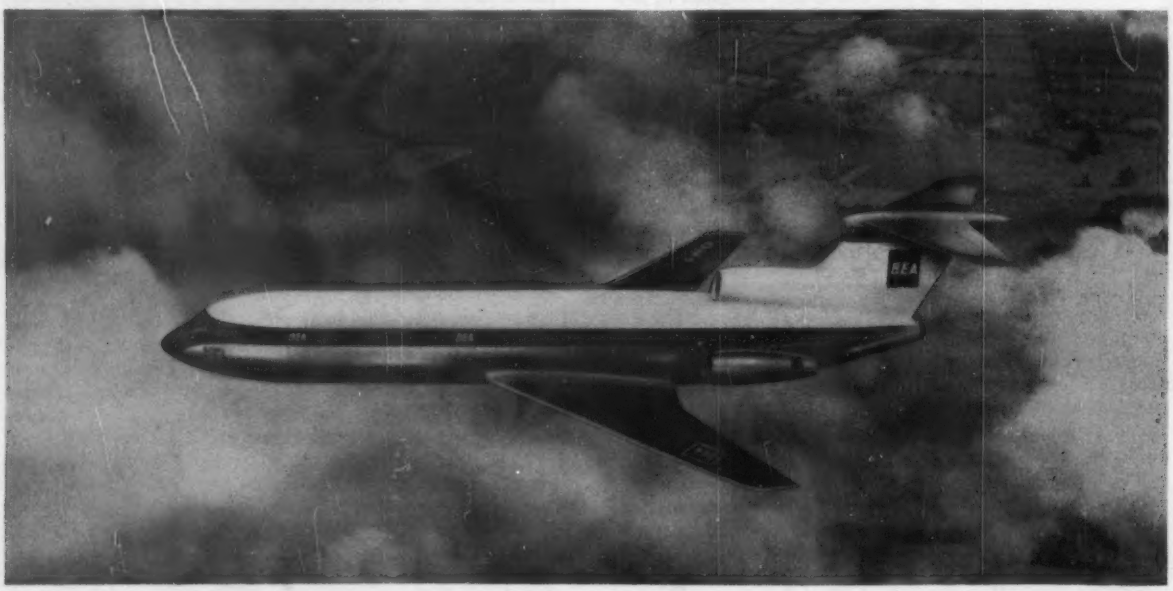
Cunard-Eagle

A few weeks later, towards the end of March, the Cunard Steam-Ship Co Ltd announced that it had acquired a controlling interest in Eagle Aviation. This brought together one of the most famous names in shipping with one of the most energetic of British independent airlines, and the two names were linked in the new title of the company—Cunard-Eagle. It was stated at the time that Cunard had decided to "enter the air" because "the climate for receiving licences for the North Atlantic route was more favourable than ever before." Cunard has presumably planned to provide considerable financial assistance for its new company, for Eagle has (in the long-range field) only one turbo-prop Britannia and two piston-engined DC-6 aircraft. If licences are approved, and Cunard-Eagle is to operate competitive services with the long-established airlines, then new equipment must be acquired; and that means jet airliners. It has already been rumoured that the company is considering buying some Comets, but I would have thought these had insufficient range for services to the Caribbean. Perhaps the company will be forced to charter Boeing 170s or DC-8s until it can take delivery of its own fleet of long-range jets. The VC.10 would appear to be the obvious choice, but if only three machines of this type were ordered, it would involve an outlay well in excess of £6 million.

The past year has seen a gradual change in the types of aircraft being operated by the independent companies. Though there is still a heavy preponderance of the older machines such as the Dakota and Viking, an increasing number of newer aircraft have been introduced. A number of ex-BEA Elizabethan machines are now flying with the independents; and, among others, they have five Britannias, five DC-6s and a number of Viscounts. An aircraft which seems to be an ideal design for some of these smaller companies is the twin-Dart Avro 748, an aircraft which falls into the broad category of a "DC-3 replacement". Several companies, including B.K.S. and Skyways, have already placed orders for 748s.

For the aircraft manufacturers 1960 was a period of consolidation after the vast and widespread changes which the industry underwent during the final months of 1959. Those changes inevitably meant that there would be some temporary slowing down while the projects in hand were re-appraised, and as a result few new aircraft flew during the year. The year was, however, highlighted by British manufacturers continuing to win orders in the face of heavy competition from abroad. The Viscount continues to be sought after, and as recently as December an order from a German company was secured; this brought the Viscount order book to 425. The big Armstrong-Whitworth Argosy freighter aircraft was ordered by the American operator Riddle Airlines; this company has placed an order for seven machines, and has taken an option on a further eight. The R.A.F. has also placed a very large order for Argosies. Then there is the Comet; seven different airlines are already operating these machines, and the coming year will see this list added to. The de Havilland Company is also now busily engaged on the Trident airliner which is being built for BEA. It must have come as a bitter blow when, towards the end of 1960, it was announced that the Boeing company had received orders for 80 of its new 727 machine—an aircraft almost identical in outline and performance to the Trident.

At the Weybridge works of Vickers-Armstrongs the first of the big VC.10 airliners is now taking shape for BOAC. This long-range airliner, with its four jet engines at the rear of the fuselage, will form the backbone of the corporation's fleet in the years to come. BOAC is to have 35 of these "standard" VC.10s, and during 1960 a contract was signed for a further ten Super VC.10s, a "stretched" version intended for North Atlantic operations and capable of carrying about 200 passengers.



An impression of the Trident, the new short-haul jet airliners for British European Airways

Survey of British Shipping*

WITH RECOMMENDATIONS AS TO POLICY

FOR British shipowners a straightforward depression is no new thing. But they have long been conscious of the increasing significance, in the long-term outlook for their industry, of forces pulling against the simple law which swings the pendulum. This, for professional ship operators offering efficiency in a free competitive field, is the law of supply and demand and, on these terms, the industry could await with comparative equanimity the passing of the present depression. But the free competitive field is continually being contracted by forms of competition for which greater efficiency is no longer a match.

British shipowners, looking beyond the depression, see many obstacles to the exercise of their energies and enterprise in the markets of the world. The markets will be there, but so also will be the fetters on their energies and enterprise. The success which these qualities achieved for British shipping has stimulated other countries into expanding their own fleets and, in the process, British shipowners are increasingly being faced with artificial hindrances to their efficiency. Hence it is necessary to turn to the aspect of government policy, and particularly the policy of governments other than our own. The governments of most other countries in Asia, Africa and South America are now taking positive nationalistic action to advance the fleets of their own flags and this means a reduction in the United Kingdom share in world-carrying trade because British shipowners cannot overcome these actions simply by providing adequate or better services. One of the reasons for this, ironically enough, may well be that by efficient ship management the cost of sea transport has—at any rate for a wide range of cargoes and particularly manufactured goods—been reduced to a point at which the freight is a relatively small element in total cost to the consumer, so that, while people often complain of the high level of freight rates, they are quite willing to accept governmental policies which inevitably result in the cost of sea transport being higher than it need be.

In these days, when economic matters are increasingly the concern of governments, commercial and political affairs are inevitably much interlocked; but, unless the basic principle that sea transport should be provided under a system of competitive enterprise is to be abandoned, the political and commercial aspects of world shipping must be looked at separately and brought into focus. This is one of the main tasks of the present survey.

Apart from permanent changes in the pattern of trade, the main factors affecting the competitive position of British shipowners, but outside their control, can be grouped under the following heads:—

(i) Direct or indirect action by the governments of certain countries designed to establish, maintain, or expand their own merchant marines by the use of discriminatory practices and subsidies.
(ii) Taxation.
(iii) The resort to flags of convenience.
(iv) What may be transitory phases, examples of which are political policies not directed at but affecting shipping, such as the American embargo on trade with Communist China and the Arab boycott of Israel.
(v) Purchases by United Kingdom importers on c.i.f. terms and sales by United Kingdom exporters on f.o.b. terms, with their effects on the routeing of traffic into ships of foreign flags.

Of the foregoing, flag discrimination, subsidies and flags of convenience constitute positive and growing threats to the long-term position of the British Mercantile Marine and that position will grow worse unless Her Majesty's Government is prepared to intensify its efforts in the way of action and assistance in support of the shipping of this country.

Departmental Administration

Government action on behalf of, or by way of assistance to, shipping can take many forms. In an abstract sense, one of the most important is attitude of mind. The Government, in all Departments of State, should always keep in mind that British shipping is the country's lifeline and that its interests are the country's interest. This calls for a much closer integration of departmental policies and the closest collaboration between the Government and the shipping industry. The conviction of the General Council that this is very necessary has led it to consider whether the present allocation of departmental responsibility for shipping—at any rate foreign-going shipping—is the most appropriate in all the circumstances.

British foreign-going shipping, being essentially the servant of international trade and to an increasing extent vulnerable to the actions and policies of foreign governments, has problems very different from those of the other and internal forms of transport, which understandably occupy much of the time and attention of the Minister of Transport and his Department.

Apart from the fact that the problems of shipping today, except in the coastal trade, have little or nothing in common with those of road and rail, these two forms of inland transport have a much greater political impact than has shipping. Virtually every citizen in this country takes a personal interest in the efficiency or otherwise of the road and rail systems; not so in shipping. From this it follows that the attention of the Minister of Transport and his Department is likely to be concentrated more on road and rail than on shipping. Moreover, that section of the Ministry of Transport that has to deal with shipping derives historically from the Mercantile Marine Department of the Board of Trade, the origin and purpose of which were to exercise such technical control as was needed to ensure the safety of British ships.

In the conditions of today, the General Council submits that the work of the Department revolves round these regulatory functions to a disproportionate extent, and that departmental responsibility for shipping should be so adjusted that the main purpose and functions of the Department are to foster the prosperity of British shipping as an industry of national importance and to ensure that it has every opportunity of earning the maximum from its function of world carriage. It necessarily follows that the shipping industry must give the Department the utmost support in its work in this vital field.

In addition, every assistance should be given by the Department in overcoming one of the industry's most pressing problems, namely, the recruitment and training of engineer officers for the Merchant Navy. British shipowners recognise that the safety of ships is dependent on adequate manning but they have felt in the past that their difficulties in recruiting and training engineers could have been eased by a less rigid attitude by the Department, and they have sometimes gained the impression that there has been a lack of understanding by the Department of the urgency of the problem.

British shipowners share with the Government the ideal that international trade should be conducted under a sys-

* Abstracts from the document issued by the General Council of British Shipping.

tem of economic freedom and without discrimination. The increasing incursion of States into what was once a field of commercial enterprise means that, if British shipping is to hold its own, Her Majesty's Government must increasingly concentrate on the removal of these State incursions or provide effective weapons to enable British shipping to overcome the effects of State-aided competition.

Flag Discrimination

The vast and intricate worldwide network of shipping services in which British shipping still plays a leading part is based on the principle of free and fair competition. Flag discrimination strikes at the very roots of this principle and, if British shipping is to retain its present commercial value to the nation, then steps must be taken to counter the increasingly damaging effects of this practice.

The term comprises a wide variety of acts and pressures exerted by governments designed to direct cargoes to ships of the national flag, regardless of the commercial considerations which normally govern the routeing of cargoes. The complexities of modern commerce, economic control and the increasing incursion of State trading organisations into the commercial field provide endless opportunities for the furtherance of policies directed to this end. Bilateral trade treaties, export and import licences, exchange control, discriminatory customs dues and direct legislative control are among the more obvious measures used. Far more difficult to identify, but none the less effective, are the pressures brought to bear by governments to ensure shipment by the national flag.

The problem is further complicated by the reasons which prompt countries to adopt these discriminatory measures. Defence needs (United States), the experience of two world wars (United States and India), national prestige (India, Burma, Brazil, Guatemala, Ceylon and others), balance of payment difficulties (India, Turkey, Spain), and ideological groupings (Russia and the Iron Curtain countries) are singly or, in varying combinations, all to be found as the motives.

It may be found that, in some cases, effective governmental action is impracticable and that, to retain some interest in a particular trade, a commercial compromise is the only solution. It is, however, a fact that the United States, acting individually, the Organisation for European Economic Cooperation (O.E.E.C.) and the International Monetary Fund (I.M.F.) have been successful in combating specific cases of discrimination. The United States has not only threatened direct retaliation and used her aid programmes for the purpose, but has also adopted general powers to take, in particular cases, whatever measures might be necessary.

Countermeasures could take a variety of forms, ranging from trade sanctions to measures aimed directly at the ships of discriminating countries. A general embargo on imports, or an embargo limited to imports carried in the ships of the discriminating country, or penal tariff rates and excess taxes on imports are examples of the former. Among the latter are the denial of the use of ports to ships of discriminating flags, or the banning of those ships from the carriage of exports, and penal port or other dues.

Many of the countries practising flag discrimination are members of IMCO and some of them (Russia, India and the Argentine) attempt to justify their action on the grounds that the relevant Article in the IMCO Convention states that "assistance and encouragement given by a government for the development of its national shipping and for purposes of security does not in itself constitute discrimination . . ." The important qualification which immediately follows—"provided that such assistance and encouragement is not based on measures designed to restrict the freedom of shipping of all flags to take part in international trade"—is ignored. The wording of the Article leaves much to be desired and, in all the circumstances, any attempt to resolve the problem by means of an international convention on the lines of that of 1923 holds out little hope of success.

No study of the subject of flag discrimination would be complete without reference to United States shipping policy, which largely holds the key to any possible solution. Collectively with the West European countries, and singly, the United States is in a unique position to control the spread of discriminatory practices. It is essential therefore that the United Kingdom and the other Western European countries should reach an understanding with the United States, which would open the way for her participation in a renewed attempt to persuade discriminating countries to abandon their practices or, if persuasion fails, in adopting countermeasures.

The broad objects of the proposed successor organisation to O.E.E.C. are to coordinate the economic policies of member countries, including America and Canada, to contribute to the expansion of countries in a state of development and to facilitate the development of world trade. For the Western European countries, shipping is an integral part of their economy and, if this organisation is to serve any useful purpose from a shipping point of view, it is essential that the parties to it not only agree on a code of liberalisation for shipping services, but are collectively prepared to give effect to it. As regards aid, this would mean that a condition of shouldering some of this burden should, in the view of the General Council, be that the United Kingdom and other European countries will not be parties to any scheme which carries with it a right, expressed or implied, for either the givers or receivers of aid to indulge in discriminatory shipping practices in the execution of the scheme. For the shipping countries of Western Europe to accept the United States into an enlarged and reorganised O.E.E.C. with the position of the United States in the matter of discrimination remaining unresolved, would be avoiding a main issue.

Cargo-Preference Legislation

There still remains a field in which the United States singly can achieve much in limiting the application of discriminatory policies. Her cargo preference legislation has served as an excuse for and has been cited in justification of the discriminatory policies of other countries. The 50 per cent American shipment of "aid" cargoes, which is the essence of this legislation, is becoming the yardstick of the shipping aspirations of the less-developed nations for all cargoes moving to and from their countries.

There is little doubt that the Americans themselves are partly to blame for this disregard of the distinction between "aid" and "trade". Under Public Resolution No 17, for example, all goods moving under the U.S. loans arranged by the Export/Import Bank of Washington are required to be shipped in U.S. vessels—although only 50 per cent is insisted on. In the immediate postwar years these loans might well have been purely government-financed, but in recent years private banks have been more and more involved, with the Export/Import Bank acting as a guarantor much in the same rôle as the Export Credit Guarantee Department of the Board of Trade, its primary object being to promote and facilitate U.S. exports. The 50 per cent American shipment rule still, however, applies as it does under other U.S. Acts to transactions which are far removed from the direct and obvious aid given under the Marshall Plan and subsequent programmes and for which the cargo-preference legislation was originally designed.



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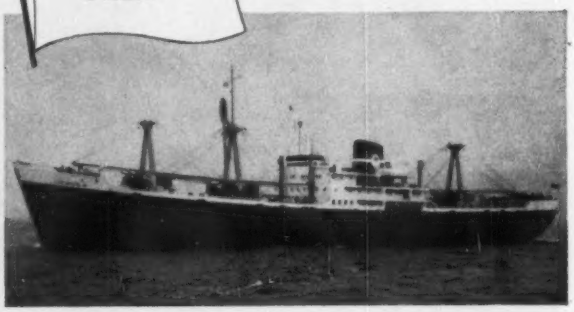
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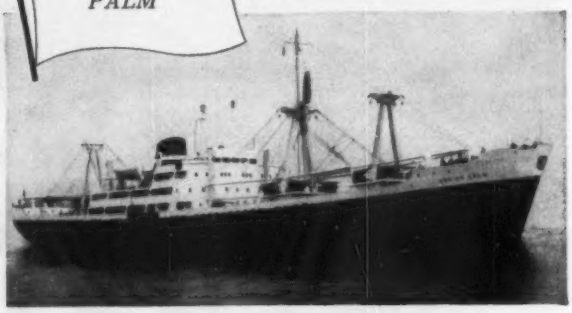
m.s. *VISTAFJORD*

13,880 tons d.w. cargo ship, built for Skibsaktieselskapet Malmtransport of Oslo.



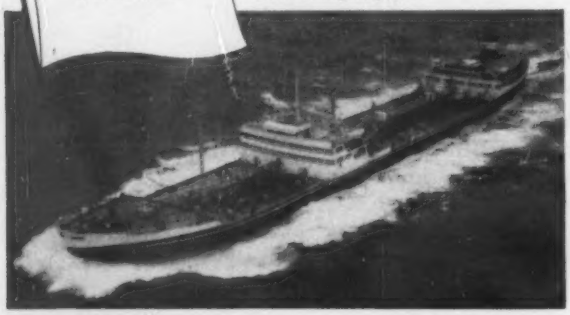
m.s. *LOBITO PALM*

8,807 tons d.w. cargo liner, built for Palm Line Ltd.



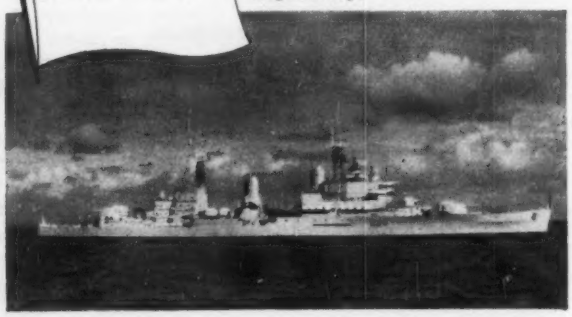
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The General Council appreciates that the United States will not readily abandon its cargo-preference legislation, but it does urge that renewed efforts be made to draw a clear distinction between "aid" and "trade". While cargo preference in respect of the former is understandable and might have to be accepted for some time to come, its continued application to transactions which are essentially commercial can only serve to encourage those who look to artificial means to foster and support a national fleet.

In its original concept, N.A.T.O. was the recognition of the importance of an identity of interest in the military field. Achievement of this has shown the equal importance of identity of interest in the economic field. In the former the shipping of the West European countries is of vital importance; in the latter it is for many an essential element of their national economy. If there is to be a true partnership in these fields with the United States, there must, therefore, be a greater understanding on her part of the damaging effects of her shipping policy on the merchant fleets of her allies and a greater awareness of the influence she can bring to bear in combating flag discrimination which, if unchecked, will destroy the very basis on which the shipping of her allies is founded.

Subsidies

Subsidies are another form of assistance to shipping with which British shipowners have to compete. From some points of view, direct subsidies may be less objectionable than policies of flag discrimination. The amount of aid given in this way should be ascertainable and the granting of a subsidy, for example, to offset higher operating costs, does not necessarily affect the freedom of ships of other nations to participate in international trade as does the operation of flag discrimination. The growth of subsidisation has now, however, become far more than a matter of equalising operating costs and is, in a number of trades, seriously handicapping the competitive position of British shipping.

The shipping of West Germany and of Japan, both starting from virtually nothing at the end of the war, has been subsidised by their governments to the extent of substantial loans for the building of new ships, either interest-free or at considerably less than commercial rates of interest. This undoubtedly helped in the restoration of the merchant fleets of these two countries to more than their prewar size in each case, with fast modern ships. India, too, assists her shipping through a government shipping development fund from which loans are granted at a 3 per cent rate of interest.

Part of the French, Italian and Indian merchant fleets is State-owned; the State operation of ships is another form of subsidised competition.

Subsidies have long been a feature of the shipping policy of the United States. British shipowners recognise that the high level of American construction and operating costs, particularly wages, are quite out of line with those of other maritime nations, so that to suggest that the Americans should not subsidise at all would be tantamount to saying that they should not have a foreign-going mercantile marine. Prior to the last war, the object of the United States subsidies was equalisation and in the main the policy was administered in this spirit. Recent extensions of subsidies and other aids given or contemplated appear to jettison the principle of equalisation. For example, the construction subsidy for two projected "super-liners"—authorised by Congress, but for the construction of which funds have not yet been appropriated—would not be calculated, as in the past, on a comparison of domestic and foreign costs. The two ships would be built by the United States Government and sold to the operating companies at prices equivalent to no more than such amount as would enable the companies to secure a "fair return" on their money. Even when a comparison of domestic and foreign costs still purports to be the basis for determining a construction subsidy, the adoption of the relatively low building costs in Japanese yards as the foreign yardstick has the effect of increasing the subsidy beyond the point of "equalisation", so far as a comparison with European building costs is concerned.

There appears, in the case of American subsidies to cargo liners, to be considerable latitude in the calculation of both the construction and operating subsidies. This is particularly so in the case of the 20-knots cargo liner, of which to date there is no comparable type operated under other flags. No true comparison of domestic building cost with foreign cost is therefore possible and the adoption of notional costs provides obvious opportunities for the greatest benefit of subsidy to be obtained.

British deep sea liners have lost ground in consequence of subsidies to United States shipping in a number of trades. Apart from the loss of traffic to fast subsidised U.S. ships operating in some of these trades, the artificially stimulated features in their design constitute uneconomic competition because the speeds of these ships are unnecessarily high from the commercial standpoint.

A subsidisation policy, based solely on the criterion of the rôle which a merchant fleet has to play in time of war, destroys the concept of the mercantile marine as a servant of international trade in times of peace and, in the long run, might well result in the mercantile marine not only being looked on as a "fourth arm of defence" but also being operated as such. In other words, shipping as a commercial enterprise would cease to exist.

The General Council is strongly of the opinion that HM Government, seeking to reach an understanding on shipping policy with the Government of the United Sates, should make every effort to persuade the latter to revert to the practice of limiting subsidies to the equalisation of the difference between domestic and foreign cost of ship construction and operation.

The acceptance of subsidies as a permanent and integral feature of British shipping policy would be directly contrary to the view until now held by British shipowners. This has been that their long-term interests lie in the greatest possible acceptance throughout the world of the belief that independent shipping, free of government aid, best serves world trade. How long that view can be maintained depends largely on the extent to which inroads into the field of free competitive enterprise in shipping can be repulsed and the field of free competitive enterprise enlarged.

No Long-Term Solution

The General Council does not consider that subsidies, as a permanent form of general assistance to British shipping, offer a long-term solution of its problems, so long as it remains possible for shipping to be operated on a commercial basis. Whether British shipping will be able to continue thus to operate depends on the policies and actions of governments over the next few years.

During this critical period, there is little doubt that the relative size of the United Kingdom merchant fleet will continue to decrease. Whether it should be allowed to decline in quality and in actual size (as well as relative size) is a different question, the answer to which lies partly with shipowners on commercial grounds and partly with the Government, on grounds of national policy. It is in these, the short-term, circumstances that financial aid to the industry in one form or another may be necessary and may be the only way of giving the quick assistance needed. In the view of the General Council, financial

(Continued on page 66)

Houlder Line Limited

AN ENCOURAGING DEVELOPMENT : VOYAGE EARNINGS VIEWED WITH MODEST SATISFACTION

Mr Walter C. Warwick's Statement



Mr Walter C. Warwick, chairman of Houlder Line Ltd

THE 63rd annual general meeting of Houlder Line Limited will be held on January 31 in London. The following is an extract from the statement by the chairman, Mr Walter C. Warwick, which has been circulated with the report and accounts:

Although the past year has been one of continued depression in the shipping industry, an encouraging development is the increased scrapping of a considerable number of ships previously laid up and as a result the tonnage of vessels laid up during the year declined from over 6 mn tons to just over 3½ mn tons.

This process of breaking up old or uneconomic vessels must in time have a beneficial effect on the level of the freight market, but there are still more ships than cargo and a large amount of new tonnage is still coming into commission so that, although the year 1960 closed with a generally higher level of activity and with open market rates tending to improve, it remains to be seen how far this rather better tendency will be maintained.

Notwithstanding the improvement in freights during the year, the current index number is still well below that at the end of 1959.

Wage Costs and Strikes

In these conditions the industry is not well placed to face up to the inflationary increase of some 15 per cent in wage costs which became effective in August last following on demands which perforce were conceded by other and more prosperous industries throughout the country. In addition, during the year the wildly-irresponsible strike of tally clerks in the London Docks—roundly condemned by the impartial committee set up by the Minister of Labour—was an additional and expensive burden on shipping using the port, while the unofficial strike of seafarers in the late summer was disruptive of sailing schedules and an inconvenience to shore staffs and officials at a busy period of the year, with serious financial loss both to the shipping industry, and the export trade and to the seafarers themselves.

During the year under review some increase in the rates of freight in the River Plate outward trade was necessary to meet the higher operating costs. As is generally known, rates of freight in the liner trades do not fluctuate as rapidly or as frequently as open market rates but are regulated by conference agreements. Without this stability in rates it would be impossible for shipowners to provide the high-class tonnage necessary to maintain frequent fast and reliable services required by both importers and exporters.

No Cause for Complacency

In the circumstances the voyage profits of £458,144 must be regarded with modest satisfaction when compared with the previous year's figure of £424,616, but it must be remembered that we had the benefit of a full year's trading of the new refrigerated steamer *Royston Grange*, which came into commission in December 1959. The profits available however do not provide an adequate return on the high capital cost of the vessels after allowing for depreciation on an adequate and prudent basis and there is certainly no cause for complacency about the earnings yield. The new fully refrigerated vessel *Hardwicke Grange*—a sister ship to the *Royston Grange*—will be coming into commission in March next and will, we hope, prove a satisfactory and efficient unit of the fleet. These vessels, specially designed for the trade, are enormously expensive and their depreciation alone requires the provision of no less than £125,000 per annum for each vessel, before it can be said that a profit has resulted from their trading operations.

As will be seen from the accounts a sum of £482,629 has been set aside for fleet depreciation; no provision is necessary for taxation of profits for the reason that the trading profit amounts to very much less than the wear and tear allowances, supplemented by the useful—but, in present conditions, largely ineffective—investment allowances. After making this allocation the profit available for the year is £86,774, to which is added the balance brought forward from the previous year of £89,301. An interim dividend of 4 per cent was paid last July and it is now recommended that a final dividend of 6 per cent be paid, making 10 per cent for the year, the same rate as previously.

Board's Borrowing Powers

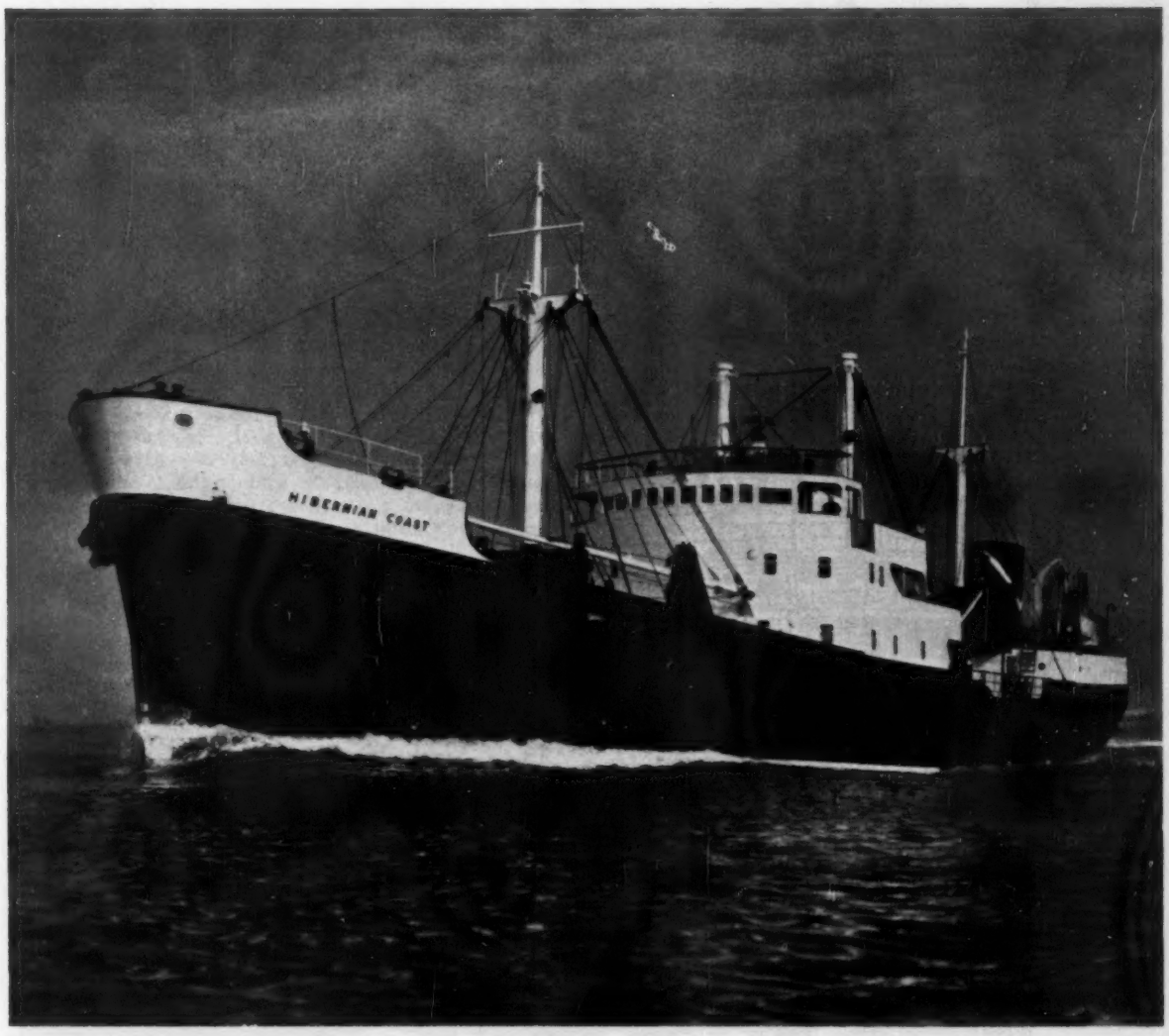
On page 1 of the report and accounts is notice of a special resolution which will be proposed for approval of shareholders for the purpose of increasing the board's borrowing powers and I would explain that since the formation of the company in 1899 the articles of association have limited to two-thirds of the issued capital, viz, £883,332, the aggregate sums which your directors are authorised to raise or borrow. This limit may have been adequate 60 years ago but it is quite out of line with requirements for finance for the construction of modern vessels and we are seeking authority to raise the limit to three times the amount of the issued capital, i.e. a maximum aggregate of £3,975,000 with the present issued capital.

It is of much interest to recall that the development of this company has been effected so far without calling upon shareholders for additional permanent capital and since the end of the last war we have spent to date £8,974,883 on new vessels and received £1,029,555 from the sale of old ships, a net expenditure wholly from internal resources of no less than £7,945,328.

Personal Note

Many shareholders will be aware that I retired on June 30 last from Royal Mail Lines Ltd and The Pacific Steam Navigation Company. I felt, and still feel—being

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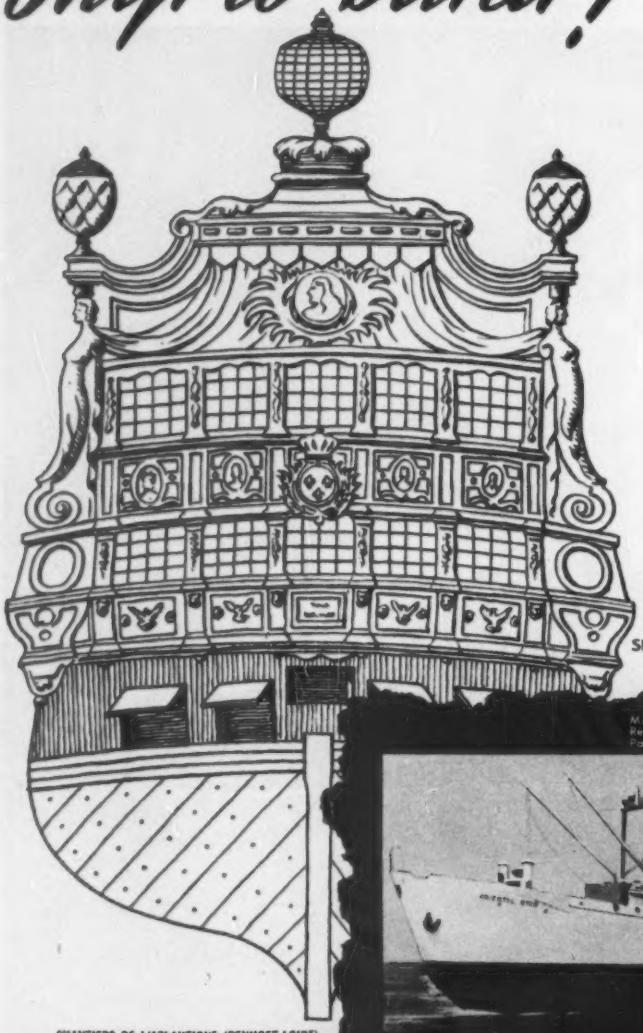
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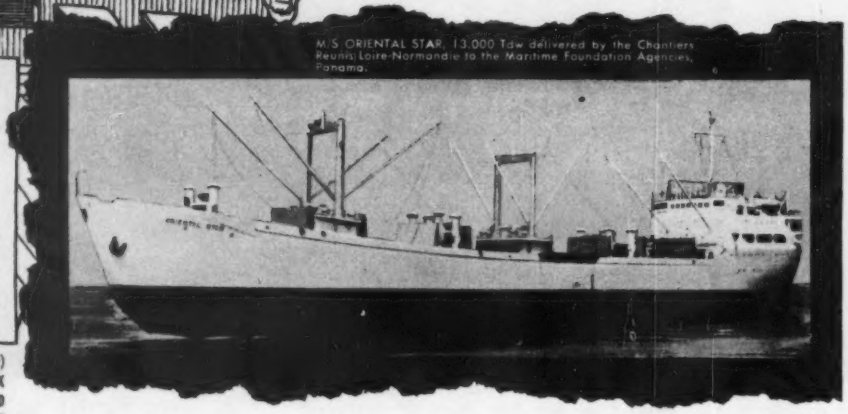
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now in my 84th year—that full chairmanship responsibilities should be assumed by my younger and well qualified colleagues, and I suggested last June retirement from the chairs of some of the Houlder group of companies. I was, however, strongly urged to remain—which I was pleased to do, but I feel I must hand over the chairmanship responsibilities during the current year.

This is probably, therefore, the last occasion I shall have of addressing you at our annual meeting.

I can look back with considerable satisfaction to the gratifying developments not only of Houlder Line but of all the Houlder group of companies and am grateful for the unfailing support received not only from all my colleagues and staff generally, but also from our shareholders.

Your directors are very conscious of the excellent services given during the year by the officials and employees of the company, ashore no less than those afloat. The labour difficulties experienced during the period provided many opportunities for demonstrations of loyalty to the company which were most gratifying and upon which I am sure we can rely in full measure in the future. It is my duty and pleasure to express to them all the thanks of the directors and shareholders.

Shipping and Shipbuilding Finance

IMPROVING FREIGHT RATES : FALLING ORDERS

By THROGMORTON

SHIPOWNERS and the builders of ships are unsure of the future, though conditions are easing for the former. The tonnage of shipping readily available still exceeds the demand for its services, operating costs stay high and favourable charters placed in the days of affluence have now mainly run out. It is true that freight rates have lately improved and that oil tanker rates rose quite sharply in the closing months of 1960 but a large, though diminishing, laid-up tonnage hangs over the markets and new ships are still leaving the stocks while world economic, financial and currency doubts are holding back expansion of international trade. Moreover competition with the air is keener than ever.

Current circumstances are against any immediate decisive recovery of freight markets though, in the cyclical nature of its business, shipping must eventually move away from slump to prosperity. It does seem, however, that the process may yet take time. That is why the Chamber of Shipping has completed a survey for Government study in which appeals are reiterated for tax concessions to help meet the inflated cost of fleet replacement, and for special aid in combating the competition of "flags of convenience". Especially is it necessary, now that profits have fallen or turned into loss, that shipowners be permitted, with certain safeguards, to credit back the investment allowances to earlier years. The special help to be given Cunard in financing the construction of its new trans-Atlantic liner is no substitute for a sympathetic and realistic revision of policy generally in favour of trades hard hit by economic change.

In the first eleven months of 1960 fifty-two shipping companies publicly issued their annual reports and accounts. Their results are thus summarised in tables compiled by the *Financial Times*:

	1960	1959
	(£'000)	
Trading profits	64,442	74,801
Depreciation	37,535	34,768
Tax	7,558	12,309
Earned ordinary dividends	11,576	19,314
Ordinary dividends (net cost)	7,816	7,849
Reserve allocations	4,393	12,344

It will be seen that trading profits of these companies fell by nearly 14 per cent to £64,442,000: shipping was the only industry of the many included in the table to show any substantial fall in earnings last year before tax and depreciation. This latter item took more, but that was due to the coming into the books of costly new tonnage. Tax took less, but that came of the lower profit return and of a tentative lightening of a fiscal burden which had become intolerable to many industries.

In the final outcome, profits available for distribution on equity capital dropped by as much as 40 per cent to £11,576,000. Dividend payments were virtually maintained but that gesture would not have been possible had not the shipping industry followed a most conservative distribution policy in the years of high profit, often in the face of City criticism. Cover for ordinary dividends is, however, down to an average of 1.5 times compared with 2.5 times in 1959 and, as profits of the shipping industry may continue for a while to show a declining trend, the boards of many shipping companies could well decide to cut down, or even to pass, dividend payments on equity capital.

It is fortunate at this juncture in the affairs of the shipping industry that its financial position is sound. Retained profits have so strengthened reserves that they, as the following table shows, are 2.8 times the issued ordinary capital they support.

	1960	1959
	(£'000)	
Issued ordinary capital	129,227	128,654
Reserves total	374,151	364,009
Net working capital	75,451	111,116

This table shows also that the industry is well supplied with working capital though, of course, it has to be borne in mind that much of it is earmarked for new building programmes. Besides, no shipping company can afford a generous distribution policy in present conditions of fleet employment.

The shipbuilders have for some months been living on the fat of order books built up in the years of postwar affluence. That has kept most of them profitably employed so that, as the table below reveals, trading profits of the 24 companies reporting in the first eleven months of 1960 are virtually unchanged. Additions to fixed assets called for a higher depreciation provision, but tax took less, so that the final outcome was a slight increase to £8,154,000 in the amount earned by these companies for payment of dividends on equity capital. Cover for these dividends was nearly 2¾ times, so that restraint of dividend payment was again exercised and reserves were further strengthened.

	1960	1959
	(£'000)	
Trading profits	21,749	21,795
Depreciation	4,543	4,191
Tax	7,341	7,574
Earned ordinary dividends	8,154	7,740
Ordinary dividends (net cost)	2,984	3,010
Reserve allocations	5,563	4,934

As appears below, accumulated reserves now come to 1.7 times issued ordinary capital of the 24 shipbuilding companies listed—a similar figure will obtain for the entire industry—so that holders of shipbuilding ordinary shares have a good protective balance sheet backing. Net

working capital is also adequate but many companies have modernisation programmes to complete.

	1960	1959
	(£'000)	
Issued ordinary capital	43,051	38,561
Reserves total	73,501	72,563
Net working capital	61,469	60,333

Net working capital of the shipbuilding, marine engineering trades looks sufficient for present purposes, or would have done before publication of the critical report on the industry by the Department of Scientific & Industrial Research. That much discussed document showed that, since 1951, the United Kingdom share of world ship launchings fell from 37 to 16 per cent and of export business had dropped from 49 to 3 per cent. Britain is now a net importer of tonnage. It is a disturbing situation, due to many causes, of which the D.S.I.R. singles out for special mention a parsimonious annual outlay on research, weaknesses on the engine side of the industry and labour intransigence. Much patience and money will have to go to putting matters right and the process will be lengthy.

Meanwhile the statistical position is discouraging, though some yards still have two years or so of profitable employment ahead. By end-September 1960 (the latest date for which full official figures are available) the tonnage of orders on the books of U.K. builders had fallen to 3,494,000 grt (valued at £525 million), compared with 6,971,000 tons at 30 September 1957. In the first nine months of 1960 orders for 140,000 tons of shipping were cancelled and net additions to the order books in that period were more than 700,000 tons short of completions. New orders taken in the 12 months to end-September 1960 totalled 589,000 tons. That was an improvement on the corresponding achievement of 1958-59 but compares badly with the 1956-57 figure of 2,708,000 tons.

Poor Outlook

It is painfully clear that the outlook for the yards and ancillary establishments, including shiprepairing, is poor. Owners will not place orders in any volume until recovery in the freight markets is well established; competition from abroad is severe in prices quoted, in delivery times and in credit terms. Cancellations and postponements disturb production plans and add to working costs that are already uncomfortably high.

It is not, therefore, surprising that the market value of shipbuilding equities has been falling throughout the greater part of 1960 and closed at around the lowest level of the year. The trend of market behaviour over the past three years can be seen in the following table:—

	Year-End		
	1960	1959	1958
Babcock & Wilcox	32/9	48/3	50/6
C. H. Bailey	1/4½	1/9	—
John Brown	42/9	52/3	33/1½
Cammell Laird	5/10½	9/9	9/6
Clarke Chapman	46/–	58/–	63/3
Wm. Doxford	74/–	105/9	78/3
Harland & Wolff	19/6	31/–	23/9
Hawthorn Leslie	33/3	44/–	40/6
Richardsons Westgarth ...	6/4½	15/–	14/6
Smiths Dock	26/–	36/–	53/–
Sunderland Shipbuilding ...	37/6	41/10½	30/–
Swan Hunter	26/–	41/6	59/1½
J. Thompson	14/6	25/–	24/6
Vickers	28/10½	39/7½	35/3

Yields now range from 4 per cent to over 10 per cent, with an average of about 7 per cent, compared with under 5 per cent for the equities of more favoured trades.

Shipping shares followed last year a direction exactly opposing that taken by shipbuilding shares; they began to move up towards the end of the year with the upward trend of freight rates. Even at the year's close, however, equity values in the shipping share market were, as the next table shows, generally below not only end-1959 but also end-1958.

	Year-End		
	1960	1959	1958
Britain	15/3	17/3	18/6
British & Commonwealth ...	45/–	47/6	44/9
Cairn	9/9	12/–	11/3
Coast Line	33/6	37/9	24/6
Court	12/9	14/3	13/–
Cunard	17/9	21/9	18/1½
Donaldson	20/–	27/–	24/–
France Fenwick	22/6	32/3	30/9
Furness Withy	46/5	47/6	35/–
Liner Holdings	60/–	61/9	48/3
London & Overseas	15/–	21/9	19/9
P. & O. (Deferred)	41/9	48/–	37/–
Reardon Smith	16/6	20/6	16/9
Royal Mail	22/3	27/3	22/6

Shipping share prices seem likely to go further ahead in 1961 and may even provide a main feature of this year's markets; share values move well ahead of events.

SURVEY OF BRITISH SHIPPING

(*Continued from page 63*)

aid would be justified in the national interest where a particular British service or a particular section of the industry is in danger of having to be abandoned or substantially reduced in strength, due to competition of a kind which can no longer be met effectively by efficient commercial operation.

The form of competition against which it may be necessary for the Government to consider financial assistance to the industry for a particular service or section of British shipping is not confined to foreign subsidised shipping services. Many of the passenger lines are faced with growing competition from air transport, artificially maintained by subsidies in one form or another. They may be direct and open; or hidden in the form of excessive payments for the carriage of mail; or of aircraft provided by governments at nominal cost; or of the expenditure of vast sums on aircraft research and development; or of the provision and servicing by governments of increasingly elaborate and expensive airports.

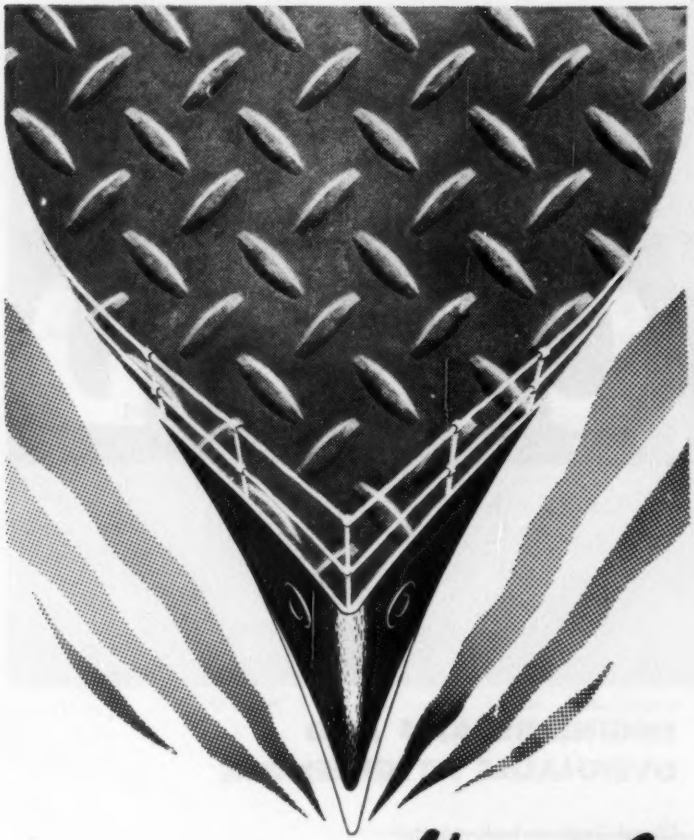
Although the public air corporations of the United Kingdom are not now in receipt of direct subsidy, they derive direct financial benefit from ready access to capital through the Exchequer, favourable rates of interest on capital so provided, and Exchequer guarantees of interest on capital borrowed otherwise. With the assurance of government financial backing, the public air corporations are in a position to cut fares, ostensibly to promote traffic, but the effect of price-cutting—particularly by the British Overseas Airways Corporation—is often to attract passengers at the expense of the shipping lines.

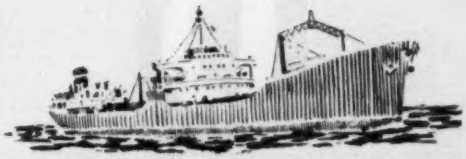
Government financial backing enables research and development to be undertaken on a scale which commercial concerns, with shareholders' money at risk, could not contemplate. There is much the Government can do to reduce the disparity between shipping and air transport so far as public expenditure on research and development is concerned. British shipping receives no advantages comparable with the large sums of public money devoted to aircraft research and development and to the maintenance of airport facilities and aids to air navigation, often at less than cost (in contrast with the fact that shipping pays its full share of the cost of the port facilities and of the lighthouse service in this country). Government expenditure on the development of a nuclear reactor for commercial marine propulsion is negligible in relation to the amount that has been, and is being, spent by the Government on aircraft research.

Flags of Convenience and Taxation

The third of the main factors affecting the long-term position of British shipping, but outside the control of British shipowners, is the tax-free, or virtually tax-free, operation of large merchant fleets under flags of con-

(*Continued on page 102*)





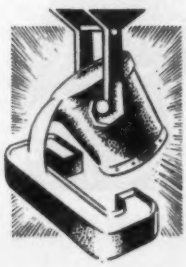
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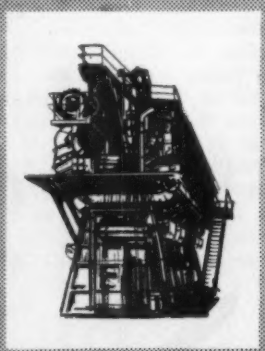
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NOTABLE SHIPS OF THE YEAR

A SELECTION OF BRITISH AND FOREIGN VESSELS

THE section of this issue that follows is devoted to a review of some of the notable ships that were built during 1960 in Britain and abroad. It is, of course, not possible to include every vessel of special interest that was completed, but it is felt that a brief résumé of some of the ships described in THE SHIPPING WORLD last year would be of value to readers. The obvious "ship of the year" is the Orient passenger liner *Oriana;* but as this vessel was fully described as recently as last November a further description is hardly warranted on this occasion —particularly as this week's issue contains a description of the propelling and auxiliary machinery in this vessel. It has therefore been decided to limit the ships to those shown in the list below.

Passenger Liners

1 *Leonardo da Vinci*
2 *Windsor Castle*

Passenger and Car Ferries

3 *Koningin Wilhelmina*
4 *Princessan Christina*
5 *Napoléon*

Gas-Turbine Ship

6 *Rembrandt*

Oil Tankers

7 *Barendrecht*
8 *Border Shepherd*
9 *Derby*

Cargo Vessels

10 *Bandeirante*

Cargo Vessels (Continued)

11 *Fremantle Star*
12 *Moana Roa*
13 *Overseas Courier*
14 *Pearl Sea*
15 *Turakina*
16 *Willowbank*
17 *Willowpool*

The "Oriana"

DETAILS of the *Oriana,* the "most notable ship of the year", were given in THE SHIPPING WORLD of 30 November 1960. The *Oriana,* which is now cruising off the Australian coast, is undoubtedly one of the most remarkable ships yet built, and incorporates many unusual features in her design. They include transverse propulsion at bow and stern, a pronounced knuckle extending back from the bow for a length of 200ft, a special funnel-shaped exhaust from the engine rooms and a bulbous bow—the first used in a British passenger liner, although used in several foreign liners.

Unique too is the mooring deck, which has been arranged below the forecastle deck. As for her profile, time alone will tell. There has been much controversy already about her appearance, but nobody can deny that she has been carefully and scientifically planned for the service in which she is employed. A total of 2,184 passengers is carried in first and tourist class accommodation. In addition space is available for insulated and general cargo. The *Oriana* is fully air conditioned and has conveyor and elevator units for handling stores and baggage.

The *Oriana,* launched by Princess Alexandra on 3 November 1959 from the Barrow-in-Furness shipyard of Vickers-Armstrongs (Shipbuilders) Ltd, is powered by twin sets of PAMETRADA steam turbines, giving her a speed in service of 27.5 knots, although she attained a mean speed of 30.64 knots on trials in Force 7 weather conditions. A description of the machinery begins on page 32.



Right: The "Oriana" under helm on trials

Notable Ships of the Year—1

The "Leonardo da Vinci"

NEW ITALIAN TRANS-ATLANTIC PASSENGER LINER

THE twin-screw turbine steamship *Leonardo da Vinci* entered the Italia Line service between Genoa and New York in July. Designed as a replacement for the *Andrea Doria*, the vessel's keel was laid in the Ansaldo shipyard at Sestri Ponente on 23 June 1957 and she was launched on 7 December 1958. The hull is 59ft longer than that of the *Andrea Doria*, but the beam is only 2ft wider. The modifications to the lines are designed to give the highest speed for the lowest propelling power and fuel consumption. The vessel's normal cruising speed is 23 knots at approximately 60,000 shp, the designed continuous output of the turbines being 70,000 shp. On trials a speed of 25.41 knots was maintained for nine hours. Over 12,000 tons of steel were used in the hull and about 200 tons of aluminium in the superstructure.

The principal particulars of the *Leonardo da Vinci* are as follows:

Length overall	760ft
Length b.p.	677ft
Moulded breadth	92ft
Depth to promenade deck	69ft
Mean draught at summer waterline	31ft 1in
Complement:	
First class	413
Cabin class	342
Tourist class	571
Passengers	1,326
Officers and crew	570
	1,896
Gross tonnage	33,000 tons
Displacement	33,000 tons

The hull is of the complete superstructure type with 11 decks, four of which are continuous. The streamlined bow is of the bulbous type and there is a cruiser stern. There is a continuous double bottom with oil and water tanks, and the hull is divided into compartments by 14 watertight bulkheads. Forward of the machinery space there are two holds and a garage for 60 cars, with refrigerating machinery and baggage rooms aft. Twin sets of Denny-Brown stabilisers are installed.

Passenger Accommodation

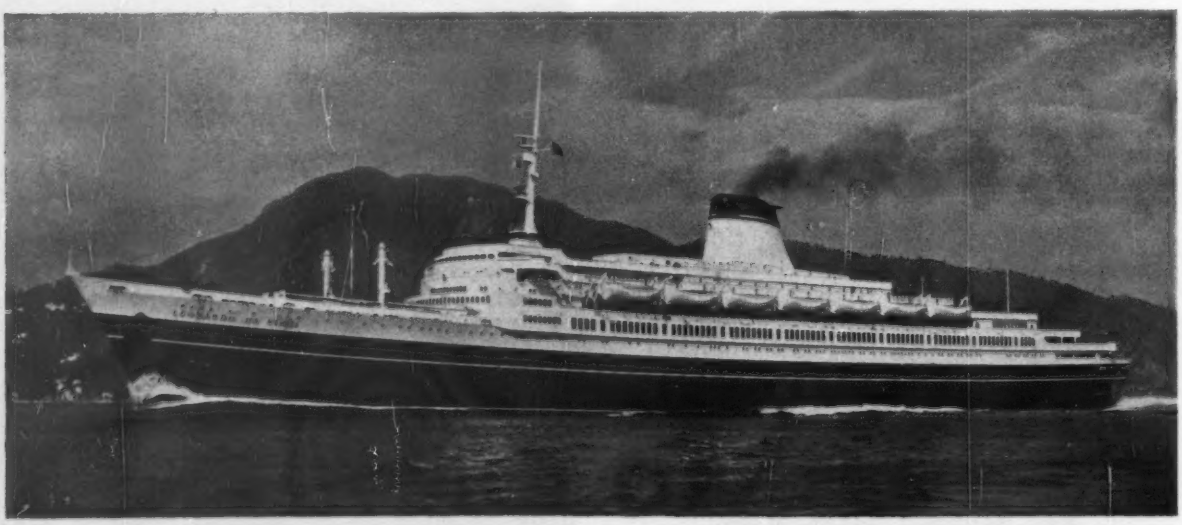
The first-class quarters include two suites, two staterooms and 170 standard cabins, with some interchangeability among the classes. The total number of 524 cabins average a little over two persons per cabin, and all the first-class staterooms as well as the cabin-class staterooms are equipped with private bathrooms; this also applies to 75 per cent of the tourist-class cabins. The first-class staterooms are equipped with a microphone hook-up for the surveillance of children, available at passengers' request.

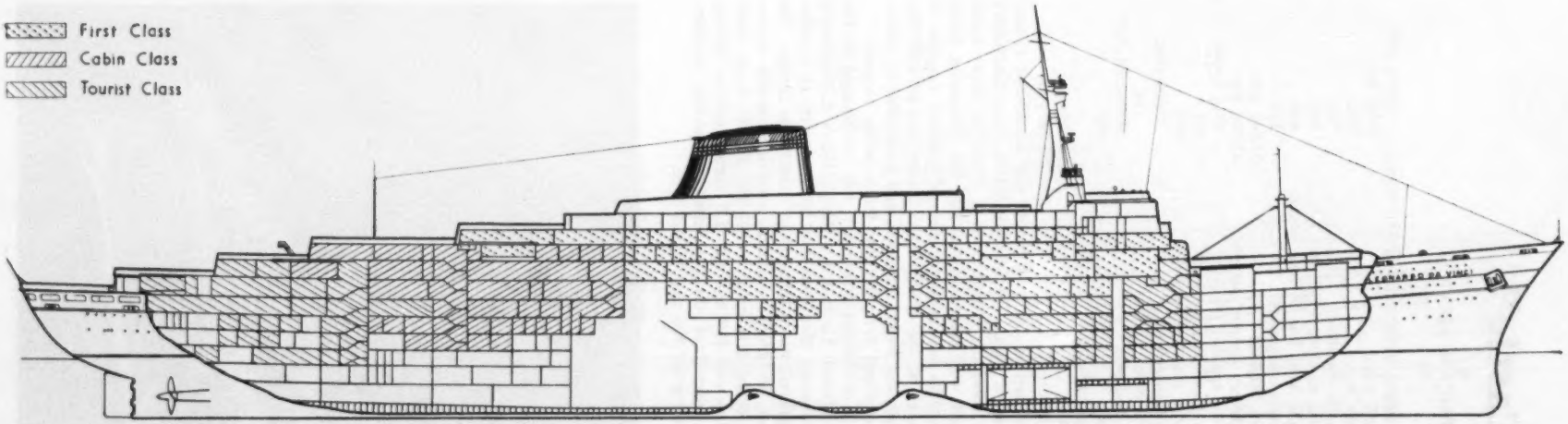
Very large areas have been set aside for outdoor games, the covered and outdoor walks and verandahs, the overall area exceeding 32,000 sq ft. Much space has been given to the Lidos by the provision of five swimming pools, one for each class and two for children. The first class enjoys a notable innovation which consists of a heating system employing infra-red rays, which makes enjoyment of the pool surroundings possible even in winter.

Postwar Italian ships have been notable for their interior decoration, which has led the world in the application of modern style to ship interior design. In the *Leonardo da Vinci* great care has been given to the choice and the workmanship of the architectural decor.

Public Rooms

The principal public rooms in the first-class accommodation include the Tapestry Room, which is 62ft long and 89ft wide; what is known as the Central Room, 62ft long and 59ft wide, containing a bar; a games room, which has leather-lined walls; a reading and writing room; and the Capri restaurant, 59ft long and 89ft wide. Adjacent is the tourist-class dining saloon, 43ft long and 82ft wide, called the Tivoli restaurant, and the two dining saloons can be thrown into one when required. Nine conveyor belts have been provided for servicing the baggage rooms, mail and the cold storage cargo.





Profile drawing of the passenger liner "Leonardo da Vinci", 33,000 grt, built by Ansaldo S.A, Sestri Ponente, for the Italia Line

Propelling Machinery

THE propelling machinery in the *Leonardo da Vinci* has been arranged in an unusual manner with the purpose of ensuring the maximum integrity against flooding. The power plant for each of the two shafts is contained in a separate compartment, housing also two boilers, gearing and essential auxiliaries and two 1,100-kW turbo-alternators. This arrangement provides two separate power units, each of which is capable of steaming the ship.



Four-berth cabin-class cabin

Between these two compartments there is a third in which the auxiliary boilers, evaporators, one 1,100-kW turbo-alternator and the after set of stabilisers have been installed.

Each power unit consists of one HP and one LP turbine, with an independent astern turbine incorporated in the forward end of the LP casing. Steam conditions are 600 lb/sq in at the HP valve chest and 840 deg F temperature: conditions which are not unduly high for current practice. For the service speed of 23 knots a minimum output of 18,000 shp is required; plus allowance for the usual 10 per cent increase. The maximum continuous output of 26,000 shp has also been allowed for in order to comply with an Italian Government requirement.

A feature of the propelling machinery is the large extent to which welding has been used. This has been done not only as a means of permanently assembling a number of smaller independently cast components, and as a means of fabrication of pieces made from plate or drawn bar; but as a means of repairing any defect shown up in the castings by repeated cycles of X-raying, chipping, welding and stress-relieving.

The HP turbine rotor has been made from a solid forging of Cr-Ni-Mo steel. The casing has a lower half cast in two pieces of Cr-Mo-Va steel and bolted together at a transverse joint in way of the second stage. The LP turbine is of the double-flow reaction type with three cast steel inner shells to each flow, and provision for bleeding to the LP feed heater between the first and second inner shells. Located inside the outer shell at the forward end is a two-stage impulse astern turbine designed for a maximum output of 10,000 shp.

An unusual feature of the LP turbine is the welded hollow rotor which has been made from two forgings of Mn-Cr-Ni-Mo-Va steel of 35 to 38 tons/sq in yield point, water quenched and tempered, yet easily weldable. This design has been developed by Ansaldo and has overcome the many problems posed by the need to use large forgings for conventional solid LP rotors.

Double-reduction articulated gearing is used and this has the first reduction train forward of the second train, and the thrust block located forward of the main wheel and between the first reduction casing. This arrangement enables the total length of the unit to be reduced and, at the same time, leaves ample space for inspection and overhaul. The casing itself is of fabricated construction throughout, only the caps are castings.

Each of the propulsion units takes steam from two Foster Wheeler watertube boilers working at a pressure of 668 lb/sq in and 842 deg F.

Notable Ships of the Year—2

The "Windsor Castle"

UNION-CASTLE LINER FOR SOUTH AFRICAN SERVICE

ON August 18 the new passenger liner *Windsor Castle* sailed from Southampton on her maiden voyage to South Africa. This 37,640 grt liner, built by Cammell Laird & Co (Shipbuilders & Engineers) Ltd, Birkenhead, for the Union-Castle Line, is the largest vessel ever employed on the Union-Castle mail service to South Africa, and is also the largest merchant ship built on Merseyside. The keel was laid on 9 December 1957 and she was launched in June 1959 by Queen Elizabeth the Queen Mother. The *Windsor Castle* cost over £10,000,000.

The new liner carries 250 first and 600 tourist class passengers in attractively designed and decorated accommodation, all of which is air conditioned. Denny-Brown stabilisers have been fitted to minimise rolling, and among the many amenities on board is a medical health spa—the first of its kind in any British passenger liner.

The steam turbine propelling machinery in the *Windsor Castle* is of particular interest and was the subject of a special article (*SW*, 17.8.60). With a normal service output of 45,000 shp the cruising speed is 22½ knots, enabling the Southampton to Cape Town run of 6,000 miles to be made in 11½ days, calling at Las Palmas or Madeira, although she will for the present conform to the present scheduled 13½ days, using 27,000 shp to give 19 knots.

In addition to carrying passengers there is both general and refrigerated cargo space. Of the total 623,000 cu ft available for this purpose, 352,000 cu ft is refrigerated for the carriage of fruit and other perishable products from South Africa. An innovation in the new ship is the provision of a special garage forward.

To speed up cargo handling, Greer power-operated hatch covers with push-button control are fitted in all seven cargo holds.

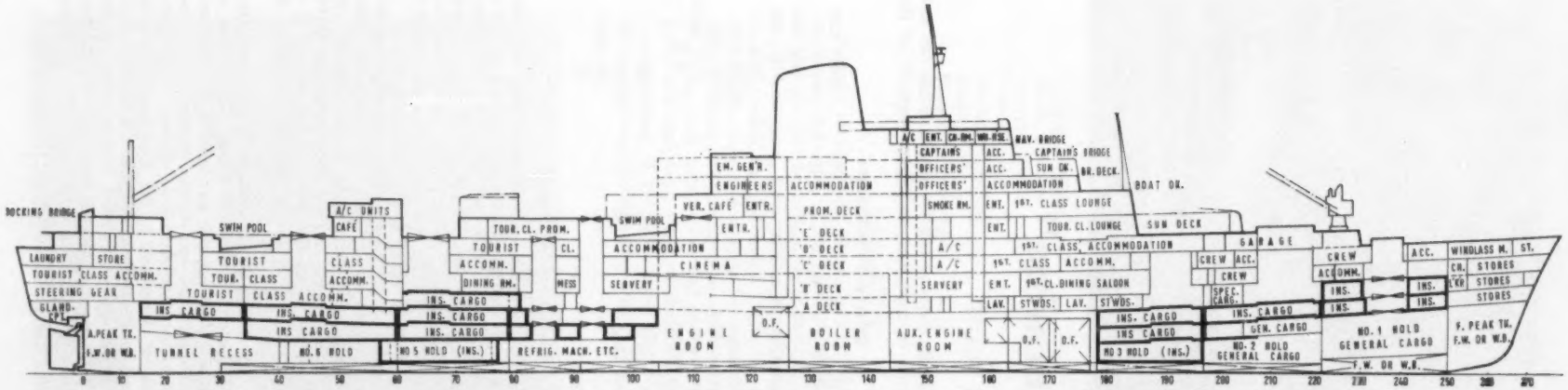
The principal particulars of the *Windsor Castle* are:

Length o.a.	783ft 3in
Length b.p.	730ft
Breadth, moulded	92ft
Depth, moulded to C deck ...	50ft
Height, load line to nav. bridge	86ft
Draught, maximum	32ft
Gross tonnage	37,640 tons
Machinery output, service ...	45,000 shp
Service speed	22½ knots
First class passengers	191
Tourist class passengers	591
Interchangeable first class or tourist	50 first class or 100 tourist class
Crew	475
Cargo capacity	
total	623,000 cu ft
refrigerated	352,000 cu ft

Cargo is carried in seven holds and associated tweendecks, three of which are forward of the main machinery space and four aft. Numbers 1, 2, 7 and 8 lower holds are arranged for general cargo and the remaining holds and tweendecks are arranged for refrigerated cargoes of fruit. Several of the refrigerated spaces are suitable for chilled meat and frozen produce, and a number of chambers are arranged for ultra-low temperature cargoes.

The main propelling machinery was constructed by the builders, Cammell Laird & Co (Shipbuilders & Engineers) Ltd, and consists of a two-shaft arrangement of double-reduction geared steam turbines to PAMETRADA design. The turbines are designed for steam conditions at the superheater outlet of 600 lb/sq in at 950 deg F. Each shaft set comprises one HP and one LP ahead turbine driving the main gearwheel through double-reduction double-helical gearing of the articulated type.





Profile of the twin-screw turbine liner "Windsor Castle", 38,000 grt, built by Cammell Laird & Co (Shipbuilders & Engineers) Ltd, for the Union-Castle Mail Steamship Co Ltd

CARGO CAPACITIES

Compartment	Grain: Top of beam and inside of shell cu ft	Bale: Bottom of beams and inside of sparrings cu ft	Bale: tons 40 cu ft	Bale: tons 50 cu ft
No 1 hold tank top	32,677	30,662	767	613
No 2 hold tank top	39,259	34,895	872	698
No 7 hold tank top	8,680	8,538	213	171
No 2 lower orlop hatch tween deck	9,987	9,966	249	199
No 5 lower orlop hatch tween deck	2,980	2,980	75	60
No 8 hold lower orlop deck	20,958	20,056	501	401
No 1 orlop hatch tween deck	5,517	5,175	129	104
No 5 orlop hatch tween deck	4,131	4,131	103	83
No 1 'E' hatch tween deck	6,045	5,011	125	100
No 2 'E' hatch tween deck	26,690	25,643	641	513
No 2 'E' deck general cargo	2,426	2,273	57	45
No 3 'E' hatch tween deck	20,977	20,356	509	407
No 5 'E' hatch tween deck	13,993	13,338	333	267
No 5 'E' deck special cargo	6,069	5,373	134	107
No 7 'E' hatch tween deck	20,264	19,742	494	395
No 8 'E' hatch tween deck	18,207	17,668	442	353
No 1 'D' hatch tween deck	9,516	9,208	230	184
No 6 'D' hatch tween deck	20,340	19,548	489	391
No 3 'B' hatch tween deck	8,481	7,886	197	158
Total general cargo	**277,197**	**262,449**	**6,560**	**5,249**
No. 3 hold tank top	28,742		719	575
No 6 hold tank top	10,287		257	206
No 2 lower orlop tween deck	10,618		265	212
No 3 lower orlop tween deck	25,248		631	505
No 5 low. temp. cargo P lower orlop deck	2,862		72	57
No 5 low. temp. cargo, lower orlop deck	1,812		45	36
No 5 low. temp. cargo S lower orlop deck	4,732		118	95
No 6 lower orlop tween deck	31,810		795	636
No 7 lower orlop tween deck	42,757		1,070	855
No 1 orlop tween deck—forward	2,204		55	44
No 1 orlop tween deck—aft	4,016		100	80
No 2 orlop tween deck	22,460		562	449
No 3 orlop tween deck	26,853		671	537
No 5 low. temp. cargo P orlop deck	4,836		121	57
No 5 low. temp. cargo, orlop deck	1,318		33	26
No. 5 low. temp. cargo S orlop deck	3,400		85	68
No 6 orlop tween deck	29,184		730	584
No 7 orlop tween deck	36,478		912	730
No 8 orlop tween deck	17,322		433	346
No 1 'E' tween deck-forward	2,622		66	52
No 1 'E' tween deck—aft	6,539		163	131
No 6 'E' tween deck	32,385		810	648
Total insulated cargo	**348,485**		**8,713**	**6,969**
Total cargo	**625,682**	**610,934**	**15,273**	**12,218**
Mail room No 1 'B' deck		7,467	187	149
Mail room No 2 'B' deck		2,553	64	51
Specie room 'B' deck		710	18	14
Baggage room 'E' deck		10,518	263	210
Baggage store 'E' deck		1,460	37	29
Garage		28,560	714	571
Total mails, etc.		**51,268**	**1,283**	**1,024**
Grand total	**676,950**	**662,202**	**16,556**	**13,242**

STORES

Compartment	cu ft
No 1 handing room, lower orlop deck	690
No 2 fish room, lower orlop deck	875
No 2 vegetable room, lower orlop deck	1,452
Miscellaneous, lower orlop deck	628
No 2 handing room, lower orlop deck	999
No 1 fish, lower orlop deck	1,133
Meat room, lower orlop deck	8,235
No 3 handing room, lower orlop deck	345
Lager room, lower orlop deck	1,065
Ice cream room, lower orlop deck	299
No 4 handing room, orlop deck	568
No 1 fruit room, orlop deck	1,720
No 2 fruit room, orlop deck	1,379
Ham room, orlop deck	2,032
No 5 handing room, orlop deck	500
No 1 vegetable room, orlop deck	3,259
Cheese, orlop deck	1,030
Milk, orlop deck	1,448
Wine room, orlop deck	4,411
Chef's larder, 'D' deck	1 020
Total insulated	**33,088**
Steward's locker (102-104), orlop deck	465
Steward's locker (88-90), orlop deck	829
Fore peak store, orlop deck	1,237
Washbasin store, 'E' deck	315
Potato store, 'E' deck	2,603
No 1 bulk store, 'E' deck	3,705
No 2 bulk store, 'E' deck	1,038
Issue room, 'E' deck	2,157
Bonded store, 'E' deck	991
Beer & minerals store, 'E' deck	6,698
Crews' linen store, 'E' deck	1,175
2nd steward's locker, 'E' deck	430
Shop store, 'E' deck	351
Fore peak store, 'E' deck	1,820
Crockery store, 'E' deck	1,009
Carpenter's store, 'E' deck	382
Fore peak store, 'D' deck	3,664
Steward's locker, 'D' deck	782
Bar store, 'C' deck	536
Linen room, 'C' deck	5,005
Boatswain's store, 'C' deck	1,581
Shop store (170-174), 'C' deck	839
Shop store (66-69), 'C' deck	539
Shop store (63½-66), 'C' deck	579
Bar store, 'A' deck	454
Bar store, promenade deck	878
Total uninsulated	**40,062**
Grand total	**73,150**

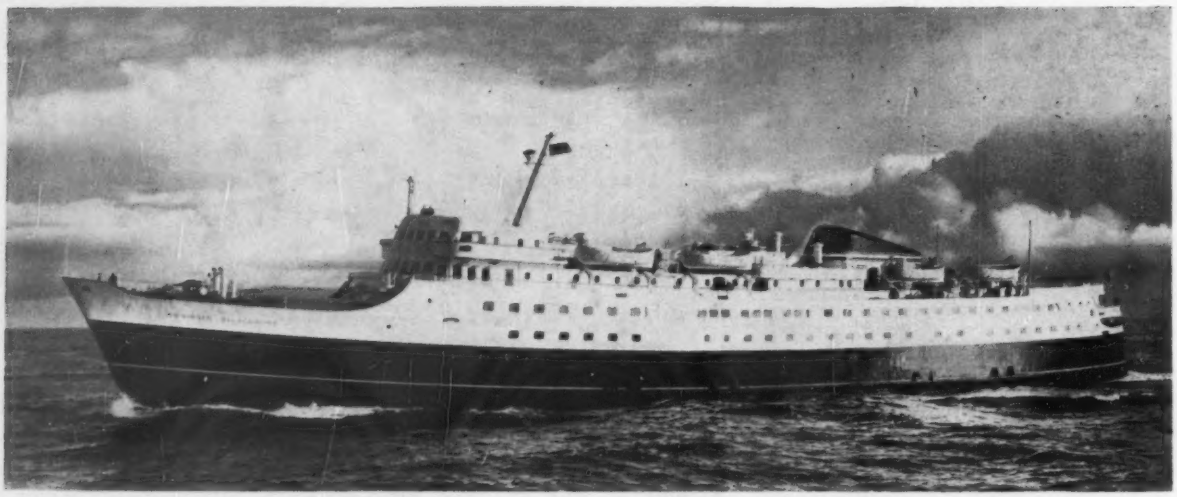
OIL FUEL

Compartment	Frames	At 38.6 cu ft/ton
Oil fuel bunker No 1 P & S outer	171–177	349.2
Oil fuel bunker No 2 P & S inner	170–177	610.2
Oil fuel bunker No 3 P & S	163–170	477.6
Oil fuel bunker No 5 P inner	159–163	95.5
Oil fuel settling, inner, P & S	120–126	128.4
Oil fuel settling, outer, P & S	120–126	152.2
Total above tank top		**1,813.1**
No 4 double bottom tanks, inner and outer, P & S	163–177	271.0
No 3 double bottom tanks, inner and outer, P & S	143–163	498.7
No 6 double bottom tanks, inner and outer, P & S	126–143	466.6
No 7 double bottom tanks, inner and outer, P & S	104–126	506.4
No 8 double bottom tanks, inner and outer, P & S	91–104	305.7
No 9 double bottom tanks, P & S	80– 91	233.3
Total oil fuel		**4,094.8**
O.F. bunker No 4 P & S (outer) (diesel oil, 40 cu ft/ton)	159–163	146.4
O.F. bunker No 5 S (inner) diesel oil, 40 cu ft/ton)	159–163	92.1
Grand total		**4,333.3**
Oil fuel overflow tank	163–170	52.6

WATER CAPACITIES

Compartment	Salt water 35 cu ft/ton	Fresh water 36 cu ft/ton
Fore peak tank	174.7	169.9
No 1 double bottom tank	184.3	179.2
No 2 double bottom tanks, P & S	145.0	141.0
No 3 double bottom tanks, P & S		253.8
No 10 double bottom tanks, P & S		249.2
No 11 Double bottom tank	135.2	131.4
No 1 deep F.W. tank (tunnel side) FRS 60-72 P & S	294.6	286.4
No 2 deep F.W. tank (tunnel side) FRS 45-59 P & S		156.4
Aft peak tank	489.3	475.7
Total	**1,423.1**	**2,043.0**

Notable Ships of the Year—3



The "Koningin Wilhelmina"

DUTCH VESSEL FOR HARWICH-HOOK ROUTE

A NEW cross-channel vessel was built for Stoomvaart Mij. Zeeland, the Dutch shipping company which maintains the day service between Harwich and the Hook of Holland. This vessel, the motorship *Koningin Wilhelmina*, has a gross tonnage of some 6,200 tons, and is thus the largest cross-channel vessel operating in southern British waters. (On the crossing to Norway, the Bergen Steamship Company's *Leda* is about 300 tons larger.) Built by NV Scheepswerf en Machinefabriek "de Merwede," of Hardinxveld, the *Koningin Wilhelmina* is also notable in other ways. Her engine room is situated in the after part of the ship, and the long, low tapered funnel and markedly raked mast give her a novel appearance.

With the entry into service of the new ship, the Zeeland company has withdrawn the old *Mecklenburg*. The service is now maintained by the *Koningin Wilhelmina* and the sister ships *Koningin Emma* and *Prinses Beatrix*. These two ships were both completed in 1939, and during the war served with the Royal Navy as infantry landing ships, their names being anglicised by the Admiralty to HMS *Queen Emma* and HMS *Princess Beatrix*. After the war they were extensively reconstructed before re-entering service.

Day and Night Services

Complementary to the day passenger service on the Harwich-Hook route is the night service, which is of course run by British Railways with the *Arnhem*, *Amsterdam* and *Duke of York*. During the holiday season, all six ships are kept at full stretch, though traffic is naturally lighter in the winter months. It is perhaps worth comment that whereas British Railways have shown in the Harwich-Hook vessels their normal preference for steam turbines, the Dutch ships are all motorships. The crossing takes about six hours at a speed of 21 knots.

The commissioning of the *Koningin Wilhelmina* will add to the passenger capacity on the route. She has a certificate for 1,600 passengers in two classes, as against the 900 carried by the *Mecklenburg*. The remaining two ships, which are about 1,500 grt smaller than the *Koningin Wilhelmina*, normally carry 1,200 passengers. However they are licensed for 1,600, and one of them carried 1,500 on one occasion in order to test the ability of the rail and terminal facilities to cope with the higher capacity of the new ship.

Principal Particulars

Length o.a.	393ft 10in
Length b.p.	361ft
Breadth	53ft 4in
Depth to embarkation deck ...	31ft 2in
Draught	16ft
Gross tonnage	6,228 tons
Machinery output	15,600 shp
Maximum speed	23.5 knots
Block coefficient	0.52
Passengers:	
First class	600
Second class	1,000
Cargo	200 tons
Motor-cars	45

Propelling Machinery

The machinery in the *Koningin Wilhelmina* consists of two MAN two-stroke turbocharged diesel engines type K-12-Z-57/80C, each coupled to a single propeller shaft. These 12-cylinder engines have an output of 7,800 shp each at 225 rpm and each is directly coupled to a Deutsche Werft collar thrust block and drives a Lips propeller of 142in diameter. Each engine is fitted with four Brown Boveri type VTR 400 turbochargers.

The ship's electricity supply comes from three diesel engine-driven alternators located in a compartment forward of the engine room. The prime movers consist of three MAN type G7 V 30/45, seven-cylinder single-acting four-stroke diesel engines of 870 shp output at 400 rpm. Coupled to each is a Heemaf type DG 153-18, 440-volts 60-cycles alternator of 640 kW output (675 kVA).

The propeller shafts follow naval practice in being supported by A-brackets instead of the usual bosses. Tank tests at Wageningen showed that with this arrangement the resistance of the hull and appendages was slightly higher, but this was outweighed by the increased propulsive efficiency of the propellers. The use of A-brackets in the *Koningin Wilhelmina* can be attributed to the past experience of the Zeeland Company's marine superintendent, a retired engineer officer of the Royal Dutch Navy. Again following naval practice, the propeller shafts are hollow and are covered with a rubber coating. They run in the A-brackets in Cutless rubber bearings.

Notable Ships of the Year—4

The "Prinsessan Christina"

NEW FERRY FOR GÖTEBORG-FREDRIKSHAVN LINE

THE Swedish shipping company Göteborg-Fredrikshavn Linjen took delivery of a twin-screw passenger and motor car ferry for operation between Sweden and Denmark. This vessel, the *Prinsessan Christina*, 2,500 grt, has been built by Aalborg Vaerft A/S, Aalborg, Denmark. She was named by H.R.H. Princess Christina of Sweden on 28 September 1959, when the ship was launched.

In addition to two controllable-pitch propellers the new ferry has a propeller fitted in a transverse tunnel in the bow. The combination of propellers enables the vessel to be manoeuvred into almost any position with remarkable ease. The *Prinsessan Christina* is powered by two diesel engines and has a service speed of 17 knots.

The principal particulars of the vessel are as follows:—

Length b.p.	283ft 7in
Breadth, moulded	255ft 11in
Depth, moulded to main deck ...	48ft 3in
Draught, loaded	19ft 8¼in
Gross tonnage	13ft 9in
Machinery output	2,500 tons
Speed, max.	2,000 bhp
Number of passengers	17.6 knots
Number of cars	940
Length o.a.	130

Platform Lifts

A novel arrangement of platform lifts has been installed, increasing the capacity for vehicles by 60 so that a total of 130 cars can be carried on each voyage. There are six upper platforms, each fitted with a hoisting system, and each platform can be raised from the car deck to the promenade deck and operated independently by its own electric motor. The foremost and two aftermost upper platforms each hold 8 cars, and the three intervening platforms will each hold 4 cars, making a total of 36 vehicles. Corresponding to the latter upper platforms, three double lower platforms (having two floors) have been fitted, and these, when lowered between the car deck and the tank top, will hold 24 cars.

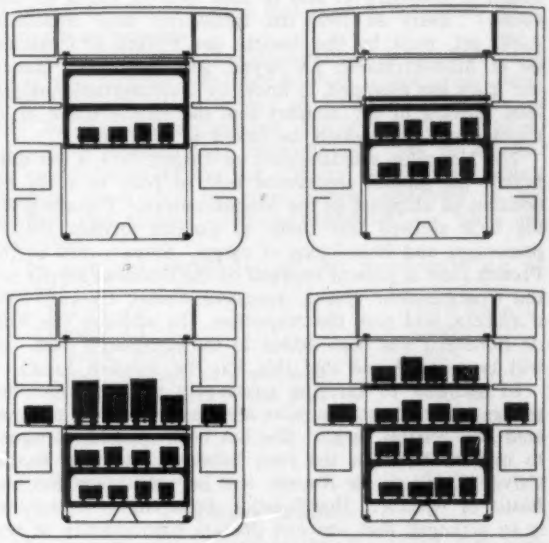
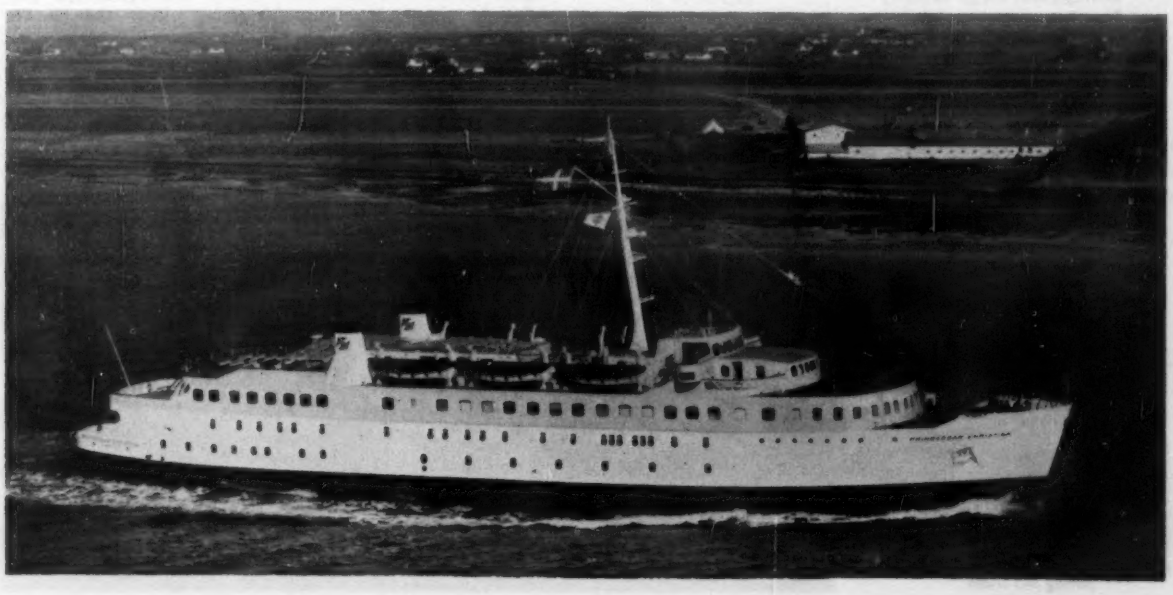


Diagram showing how the vehicles are loaded on to the various platform decks

Propelling Machinery

The propelling machinery in the *Prinsessan Christina* consists of two Nohab-Polar five-cylinder two-stroke diesel engines, type M65T, developing a total output of 4,000 bhp at 250 rpm and giving the ship a speed of about 17 knots. The KaMeWa variable pitch propellers can be controlled from the bridge.



Notable Ships of the Year—5

Passenger Ship "Napoléon"

PASSENGER LINER FOR SERVICE BETWEEN FRANCE AND CORSICA

SUCH has been the increase in the tourist trade between the South of France and Corsica that the French Line found it necessary to add to their fleet of liners on that route. Early in 1960 the twin-screw ship *Napoléon*, 4,000 grt, built by the Société des Forges et Chantiers de la Méditerrannée, La Seyne, was delivered. During her trials she exceeded 20 knots by a comfortable margin, thus proving to her builders that the service speed of 18 knots could quite easily be raised to 19 knots.

The *Napoléon* was launched on 4 April 1959, a few days before the annual conference held in Nice to study the position of shipping in the Mediterranean. Figures given for 1958 showed that traffic to Corsica totalled 284,179 passengers and 99,691 tons of cargo. Ships owned by the French Line at present engaged on the Corsican service are the *Commandant Quéré, Sampiero Corso, Cyrnos, Ville d'Ajaccio,* and now the *Napoléon*. In addition the *Ville de Bordeaux* has been added to the company's fleet. (It will be remembered that this was the Swedish *Saga*.)

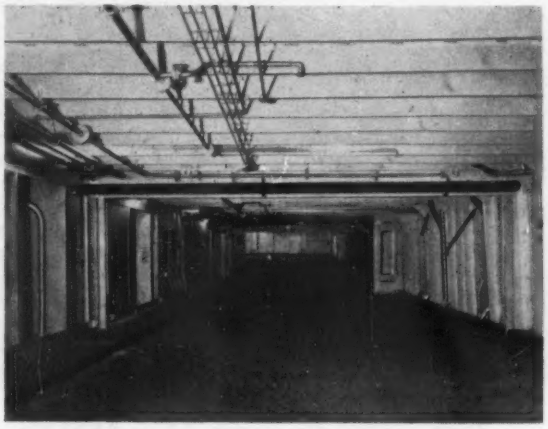
In addition to carrying passengers the *Napoléon* has garage space for automobiles and space for both refrigerated and general cargo. She has been specially designed to operate both on the runs between Nice and Bastia, Calvi, Ajaccio or Ile Rousse, and between Marseilles and Bastia or Ajaccio. Her Pielstick diesel engine installation is so arranged that she can operate economically at two speeds. A feature is the Voith-Schneider propeller which has been installed in her bow and which enables a tug of about 300 hp to be dispensed with when the vessel is entering Corsican ports. She also has variable pitch propellers.

The principal particulars of the *Napoléon* are as follows:

Length o.a.	356ft 6in
Length b.p.	326ft 4½in
Breadth, extreme	51ft 11in
Depth to upper deck	28ft 3in
Draught, loaded	15ft 7in
Gross tonnage	4,000 tons
Machinery output	8,000 hp
Service speeds	14½ and 18 knots
Total volume of tweendecks and holds	134,140 cu ft
Refrigerated cargo capacity ...	21,186 cu ft
Number of automobiles	100
Number of passengers	1,200

The accommodation is arranged as follows:—

Four passengers in two-berth cabins de luxe, nine priority passengers, 60 first-class passengers in cabins, 12 first-class passengers in armchairs, 80 first-class passengers in deck chairs, 30 first or second-class passengers in cabins, 200 second-class passengers in cabins, 36 second-class passengers in armchairs, 24 second-class passengers in deck chairs, 400 fourth-class passengers on the tweendecks, 353 passengers on the open deck (in summer). Including the crew, a total of 1,284 persons can be carried.



A view of the garage space which can be partitioned off by fireproof steel and asbestos curtains

Propelling Machinery

The propelling machinery in the *Napoléon* consists of four turbocharged S.E.M.T.-Pielstick four-stroke diesel engines type I 6L 6PC, of 400mm bore and 450mm stroke, each developing 2,000 hp at 440 rpm. They were built by the Société Générale de Constructions Mecaniques La Courneuve. The vessel has twin propeller shafts and each pair of engines drives one shaft through ASEA electro-magnetic couplings and reduction gearing which bring the propeller revolutions down to 175 rpm.

This arrangement of machinery has been very carefully planned, not only so as to take up the minimum of space, but because of the two different services on which the ship will operate. Thus, on the run between Nice and the Corsican ports, where a speed of 14½ knots is required, two motors only are used, one on each shaft. Furthermore, when manoeuvring, it is possible to run one engine ahead and the other astern and rotate the propeller in either direction, energising either the one or other ASEA coupling.



Aerial view of the Napoléon taken during sea trials

Notable Ships of the Year—6

Gas Turbine Ship "Rembrandt"

BRITISH CARGO SHIP WITH FREE-PISTON MACHINERY

THE FIRST British ship to be specially designed for free-piston/gas-turbine propulsion underwent extensive trials before being handed over the Bolton Steam Shipping Co Ltd, London. This vessel, the *Rembrandt*, 12,940 dwt, was built by Smith's Dock Co Ltd, Middlesbrough; this firm was also responsible for the conversion of the *Goodwood* from steam to free-piston machinery (*SW*, 6.5.59 and 6.1.60). Being designed from the outset for free-piston propulsion in the *Rembrandt*, the characteristics of the machinery have been fully exploited to yield the maximum possible deadweight and cubic capacity on given dimensions.

Careful consideration has been given to manoeuvring properties and the provision of ample astern power. The Stone-KaMeWa controllable-pitch propeller with which the ship has been fitted—incidentally the largest propeller of this type to be built in the United Kingdom—provides the most efficient way of utilising engine power for stopping and going astern. It also enables an unidirectional gas turbine to be employed, thus avoiding the losses which would be entailed if an astern stage were used.

Operation on Heavy Fuel

The *Rembrandt* is equipped with five GS.34 gasifiers (one for standby purposes) which supply gas to an A.E.I. non-reversing gas turbine driving the c/p propeller through locked-train double-reduction gearing. During the first few months the machinery operated on marine diesel fuel, but it is now operating on residual fuels, and self-cleaning purifying equipment has been installed.

During a short run off the mouth of the Tees it was possible to inspect the engine room while the machinery was running. The gasifiers are in a separate compartment as shown on the accompanying drawings, and very little noise is transmitted from this space to the rest of the ship. The layout of the machinery is compact and allows plenty of room for maintenance. The dimensions of the gasifier room were carefully selected so as to ensure that pulsation is reduced to a minimum, and insulation on the deck head and bulkheads ensures that noise is dampened down as much as possible.

During sea trials in ballast condition a speed of 14.58 knots was attained; the specific fuel consumption being 0.428 lb/shp-hr at an output of 3,870 shp. This figure will undoubtedly be reduced during service. Observations have revealed that improvements may be effected by modifications to the gas ducting in order to reduce pressure losses, and by more precise matching of the gasifiers and turbine. These possibilities are being investigated.

The principal particulars of the *Rembrandt* are as follows:

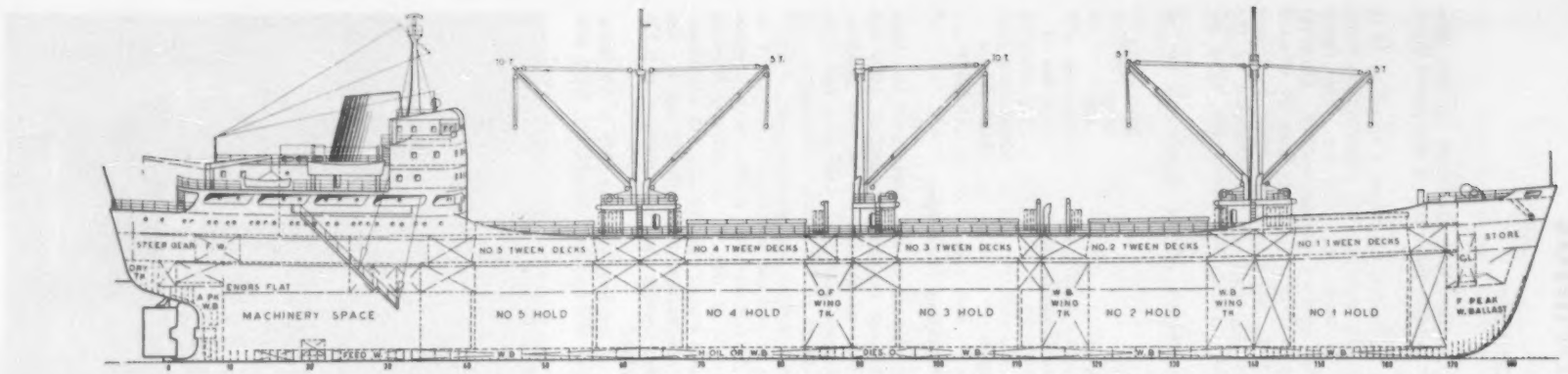
Length o.a.	491ft 9¾in
Length b.p.	460ft
Breadth, moulded	63ft
Depth, moulded to upper deck ...	41ft 9in
Depth, moulded to second deck ...	32ft 6in
Draught	27ft 8in
Deadweight	12,940 tons
Machinery output	4,000 shp
Service speed	13 knots

Propelling Machinery

The propelling machinery in the *Rembrandt* has been designed for a continuous maximum output of 4,000 shp at 110 rpm using four of the five GS.34 type gasifiers, and a one-hour overload rating of 4,400 shp has been allowed for in the design of the various components. At maximum continuous output the designed gas delivery pressure is 44 lb/sq in and the temperature 860 deg F to produce 1,230 gas horsepower per gasifier with a mean ambient temperature of 86 deg. F. In extreme tropical conditions all the main engine components will accommodate a gas delivery temperature of up to 950 deg F. On the test bed a gasifier specific fuel consumption of 0.326 lb/ghp-hr was obtained.

The total weight of machinery in the ship is 420 tons. This includes the main and auxiliary machinery, pipes and





Profile of the gas turbine cargo vessel "Rembrandt", 12,940 dwt, built by Smith's Dock Co Ltd, for the Bolton Steam Shipping Co Ltd

fittings, oil and water systems, sterngear, tanks, ladders, floors and gratings, funnel and vents, spares and stores. The breakdown of the main machinery weight is as follows:

5 GS.34 type gasifiers with re-circulation ...	41 tons
1 gas turbine with lagging and cleading ...	6 tons
1 double-reduction gearbox with thrust block	30.15 tons
1 set gas piping between gasifiers and turbine complete with lagging	3.5 tons
1 control console with instruments	1.15 tons
1 set blow-off piping complete with lagging ...	1.3 tons
Total ...	83.1 tons

Auxiliary Machinery

In general the auxiliary machinery is what one would expect to find in any modern motor vessel, and relative to the main propelling machinery output is of similar capacity. It is, however, noticeable that there is a marked reduction in the size of the air compressing plant and air storage tank capacity. All pumps are electric motor driven and electricity for these and for lighting is supplied at 200 volts DC by two 200-kW and two 75-kW generators powered by Ruston diesel engines. A dead front switchboard allows any combination of generators to be operated in parallel, so that it is possible to operate with a reasonable load factor under all sea and port conditions.

The gasifiers are now operating on intermediate bunker fuels of viscosities up to 1,500 second Redwood No 1 at 100 deg F. A viscotherm viscosity indicator has been supplied by Frank S. Tolliday & Partners Ltd, London, to control the viscosity.

TANK CAPACITIES

Compartment	Frames	Length ft in	100% cap. cu ft	98% cap. cu ft	W.B. 35 cu ft/ton	F.W. 35.96 cu ft/ton	Tons O. 98% 39 cu ft/ton	D.O. 98% 41 cu ft/ton
No 1 c.d.b. tank	140–169	65 3	5,142	—	146.9	—	—	—
No 1 c.d.b. tank port side	113–140	72 0	6,641	—	189.7	—	—	—
No 1 c.d.b. tank stbd. side ...	113–140	72 0	6,702	—	191.5	—	—	—
No 3 forward c.d.b. tank, P & S ...	97–113	42 8	9,172	—	262.0	—	—	108.8
No 3 aft c.d.b. tank, P & S	89– 97	21 4	4,550	4,460	—	—	—	—
No 4 c.d.b. tank, P & S	62– 89	72 0	14,130	13,848	403.7	—	355.1	—
C.D.B. oil fuel overflow	85– 89	10 8	714	700	—	—	17.9	—
No 5 c.d.b. tank, port side	33– 62	77 4	5,281	—	150.9	—	—	—
No 5 c.d.b. tank, stbd. side	33– 62	77 4	5,218	—	149.1	—	—	—
No 6 forward c.d.b. tank (feed water) ...	23– 32	24 0	1,529	—	—	42.5	—	—
No 6 aft c.d.b. tank, port side	13– 18	13 4	190	186	—	—	4.8	—
No 6 aft c.d.b. tank, stbd. side	13– 18	13 4	190	186	—	—	—	4.5
Fore peak tank	169–stem	30 11	9,378	—	267.9	—	—	—
Fore wing tank, P & S	134–140	16 0	17,042	—	486.8	—	—	—
Aft wing tank, P & S	113–119	16 0	17,932	—	512.4	—	—	—
Oil fuel wing tank, P & S	83– 89	16 5	17,894	17,594	—	—	451.1	—
Aft peak tank	0– 9	18 0	5,848	—	167.1	—	—	—
Drinking water tank, P	4– 11	15 4	1,373	—	—	38.2	—	—
Washing water tank, S	4– 11	15 4	4,174	—	—	116.1	—	—
Forward settling tank, P	31– 34	8 0	645	632	—	—	16.2	—
C'r settling tank, P	28– 31	8 0	570	559	—	—	14.3	—
Aft settling tank, P	25– 28	8 0	494	484	—	—	12.4	—
Forward settling tank, S	31– 34	8 0	645	632	—	—	—	15.4
C'r settling tank, S	28– 31	8 0	570	559	—	—	—	13.6
Aft settling tank, S	25– 28	8 0	494	484	—	—	—	11.8
Total					**2,928.0**	**196.8**	**871.8**	**154.1**

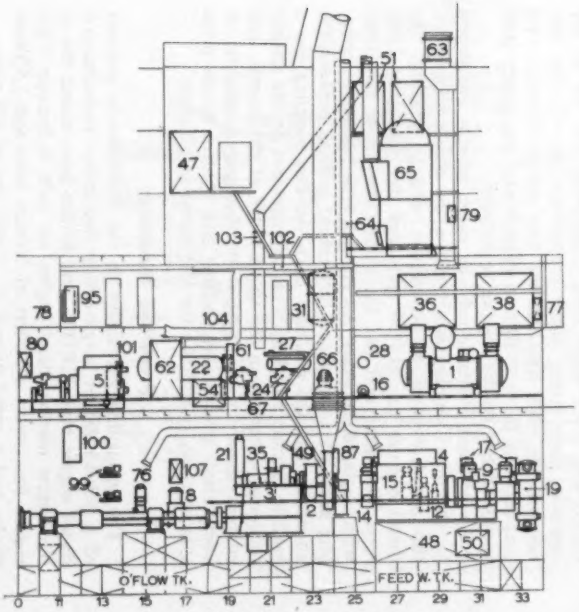
N.B. for tanks marked P & S capacities given are port side plus starbd. side.

CARGO CAPACITIES

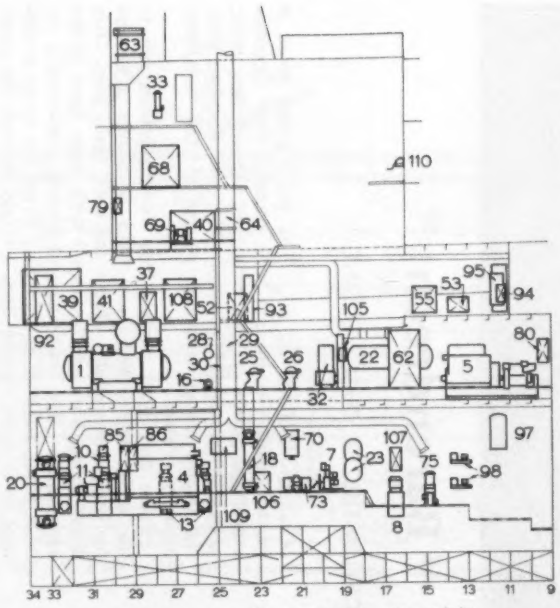
Compartment	Frames	Grain cu ft	Bale cu ft	L.C.G.	V.C.G.
No 1 hold ...	140–169	87,914	79,966	166.03 F	20.97
No 2 hold	113–140	96,706	92,013	101.44 F	18.98
No 3 hold	89–113	115,015	108,180	33.56 F	18.69
No 4 hold	62– 89	111,224	104,002	38.94 A	18.72
No 5 hold	34– 62	124,637	114,903	106.29 A	19.35
Total holds ...		**535,496**	**499,966**	19.96 F	19.28
No 1 tween decks ...	140–169	34,887	92,609	168.02 F	40.22
No 2 tween decks ...	113–140	43,766	41,004	101.20 F	38.48
No 3 tween decks ...	89–113	38,797	36,286	33.74 F	38.38
No 4 tween decks ...	62– 87	40,641	37,961	36.95 A	38.31
No 5 tween decks ...	35– 62	43,110	40,431	106.49 A	38.44
Tonnage well ...	87– 89	3,139	2,784	1.22 A	37.86
Total tween decks		**204,340**	**191,075**	26.93 F	38.71
Grand total ...		**759,836**	**691,041**	21.88 F	24.60

STORES

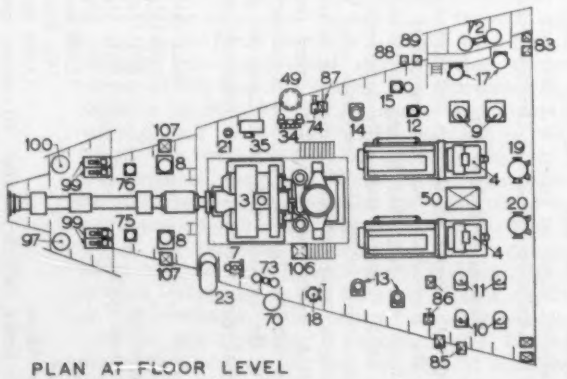
Compartment	Frames	Capacity in cu ft Grain	Bale	L.C.G	V.C.G.
Store on second deck forward	169–stem	5,556	4,950	214.52 F	42.17
Rope store	Stern–E	827	670	243.67 A	48.83
Stewards' store ...	E–S	2,817	2,513	229.83 A	48.0
Provision store ...	Stern 1	2,303	1,977	236.36 A	48.5
Lamp room	166–171	697	578	202.03 F	48.83
Paint room	166–171	799	668	200.82 F	48.83
Forward masthouse deck Store ...	36½–141½	1,130	867	135.0 F	48.25
Forward masthouse electrical store ...	136½–139	689	547	131.0 F	48.25
masthouse deck Store	89–92½	1,032	748	6.17 F	47.63
Total stores ...		**5,850**	**13,518**		
Forecastle space ...	166–stem	6,461	5,663	214.32 F	50.33



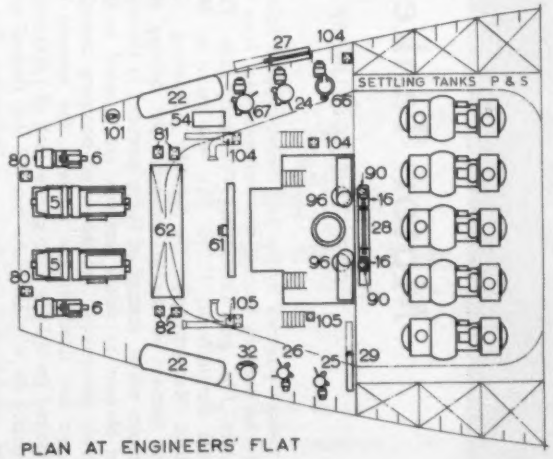
ELEVATION AT ℄ LOOKING TO PORT



ELEVATION AT ℄ LOOKING TO ST'B'D.



PLAN AT FLOOR LEVEL

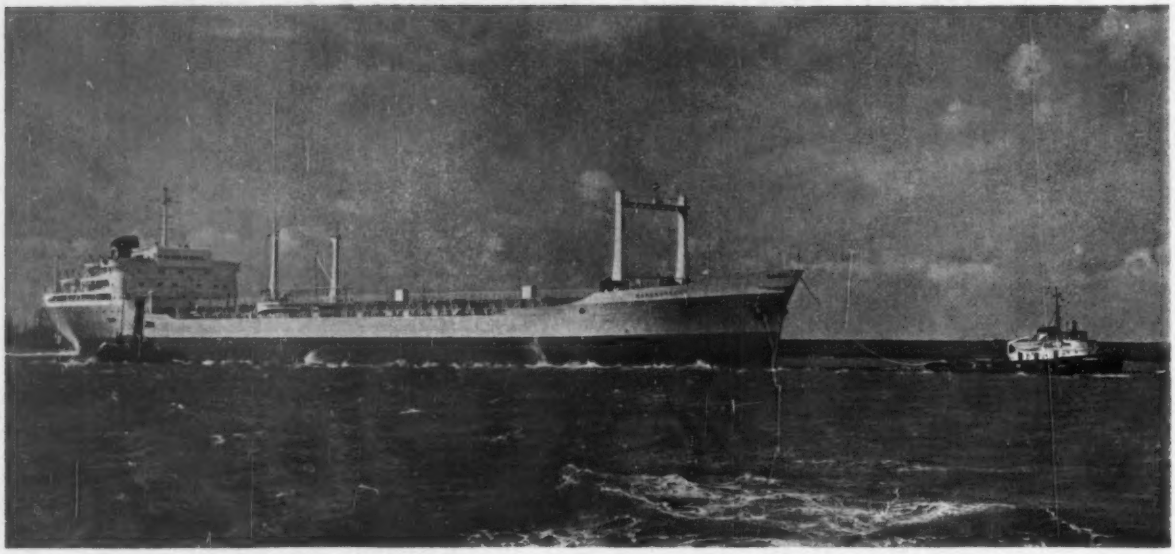


PLAN AT ENGINEERS' FLAT

1 Free piston gasifiers
2 Gas turbine
3 Reduction gearbox
4 Main diesel generators
5 Aux. diesel generators
6 Air compressors
7 Emergency compressor
8 Lubricating oil pumps
9 Piston cooling oil pumps
10 Jacket water pumps
11 S.W. circulating pumps
12 Diesel generator S.W. circ. pump
13 Ballast pumps
14 Bilge pump
15 General service pump
16 Oil fuel surcharge pumps
17 Oil fuel transfer pumps
18 Lubricating oil cooler
19 Piston oil cooler
20 Jacket water cooler
21 Drain cooler
22 Main air receivers
23 Diesel gen. air receivers
24 Heavy oil fuel purifier
25 Diesel oil fuel purifier
26 Lubricating oil purifier
27 Heavy oil purifier heater
28 Main engine heavy O. F. heater
29 Lubricating oil purifier heater
30 Diesel oil purifier heater
31 Oily bilge separator
32 Evaporator
33 Distiller
34 Feed pumps
35 Feed filter tank
36 Lub. oil and piston cooling oil tk.
37 Diesel generators lub. oil cleaning tk.
38 Cylinder oil storage tank
39 Lubricating oil cleaning tank
40 Jacket water header tank
41 Lubricating oil (aux.) storage tank
42 Centrifuge oil storage tank
43 Paraffin oil storage tank
44 Gas oil tk. for emergy.-comp.
45 Colza oil storage tank
46 Lubricating oil storage tank
47 Lubricating oil gravity tank
48 Piston cooling oil suction tank
49 Sludge tank
50 Oil residue tank
51 Boiler oil service tanks
52 Main gen. J.W. header tank
53 Aux. gen. J.W. header tank
54 Oil observation drain tank
55 75 kW diesel gen. fuel service tank
56 Lathe
57 Drilling machine
58 Grinder
59 Bench with vice and drawers
60 Lockers and shelves
61 Control console
62 Main switchboard
63 Ventilation fans to gasifier room
64 Ventilation fans for engine room
65 Boiler, oil fired
66 H. O. fuel purifier
67 Heavy oil fuel clarifier
68 Jacket water storage tank
69 Duplex fan sets for boilers
70 Sludge tk. for L. O. and D. O. purifiers
71 Water tank for purifier
72 Duplex strainers P. C. system
73 Dup. strainers turbine and lub. oil
74 Sludge pump
75 Propeller oil pump (cont.)
76 Propeller oil pump (inter.)
77 Gasifier cylinder oil service tk.
78 Propeller oil header tank
79 Starters for duplex fan sets
80 Starters for compressors
81 Starters for P. C. oil pumps
82 Starters for L. O. pumps
83 Starters for O. F. transfer pumps
85 Starters for J. W. pumps
86 Starters for ballast pumps
87 Starter for bilge pump
88 Starter for gen. pumps
89 Starter for aux. S. W. circ. pump
90 Starters for surcharge pumps
91 Spare tube stack for piston oil cooler
92 Spare tube stack for J. W. cooler
93 Spare tube stack for L. O. cooler
94 Stern tube lub. oil tank
95 Heat recovery silencer for aux. gen.
96 Heat recovery silencer for main gen.
97 Pressure vessel
98 Domestic sanitary pumps
99 Fresh water pumps
100 Pressure vessel (fresh water)
101 Drinking water pump
102 Overhead crane
103 Fan for purifier flat
104 Starters for H. O. fuel purifiers
105 Starters for L. O. and D. O. purifiers
106 Starter for turning gear motor
107 Starter for propeller oil pumps
108 Reserve cylinder oil storage tank
109 Turbine and gearbox instrument panel
110 Hand winch

Machinery arrangement in the gas turbine ship "Rembrandt". The GS 34 gasifiers were made by Smith's Dock Co Ltd, and the gas turbine and reduction gearing by A.E.I. Rugby

Notable Ships of the Year—7



Motor Tanker "Barendrecht"

FIRST TWELVE-CYLINDER SCHELDE-SULZER DIESEL ENGINE

AN OIL TANKER powered by the first twelve-cylinder Sulzer engine to be built in Europe was delivered last June to her owners, Phs. van Ommeren NV, Rotterdam. This vessel, the *Barendrecht*, 32,090 dwt, was built by NV Koninklijke Maatschappij "De Schelde", Flushing. Of particular interest is the arrangement for driving the cargo pumps which, instead of being powered in the conventional manner by steam turbines, are coupled to the diesel-driven generators. As the cargo pumping capacity is more or less fixed by the tonnage, the amount of steam required for driving four pumps each of 1,000 tons/hour capacity in a tanker the size of the *Barendrecht* would be considerable—in fact it is estimated that it would be between 2,500 and 2,700 bhp. Diesel-driven pumps will also be fitted on board a 32,000-tons tanker on order at De Schelde for London & Overseas Freighters Ltd.

Navigating Bridge Aft

In common with several oil tankers and bulk carriers now at sea, the *Barendrecht* has her navigating bridge aft. Apart from the fact that having accommodation amidships in an oil tanker is potentially dangerous, there are many advantages in housing everyone aft. Where air conditioning is employed this is simplified, as are also electrical wiring, steam lines, etc. Furthermore there is no longer the necessity for the long, and sometimes wet, journey along the catwalk with food from the galley.

The principal particulars of the *Barendrecht* are as follows:—

Length o.a.	664ft 8½in
Length b.p.	629ft 11¼in
Breadth, moulded	87ft 11in
Depth to main deck	45ft 5¼in
Draught	34ft 1⅜in
Deadweight	32,090 tons
Trial speed	16¾ knots
Machinery output	15,600 shp

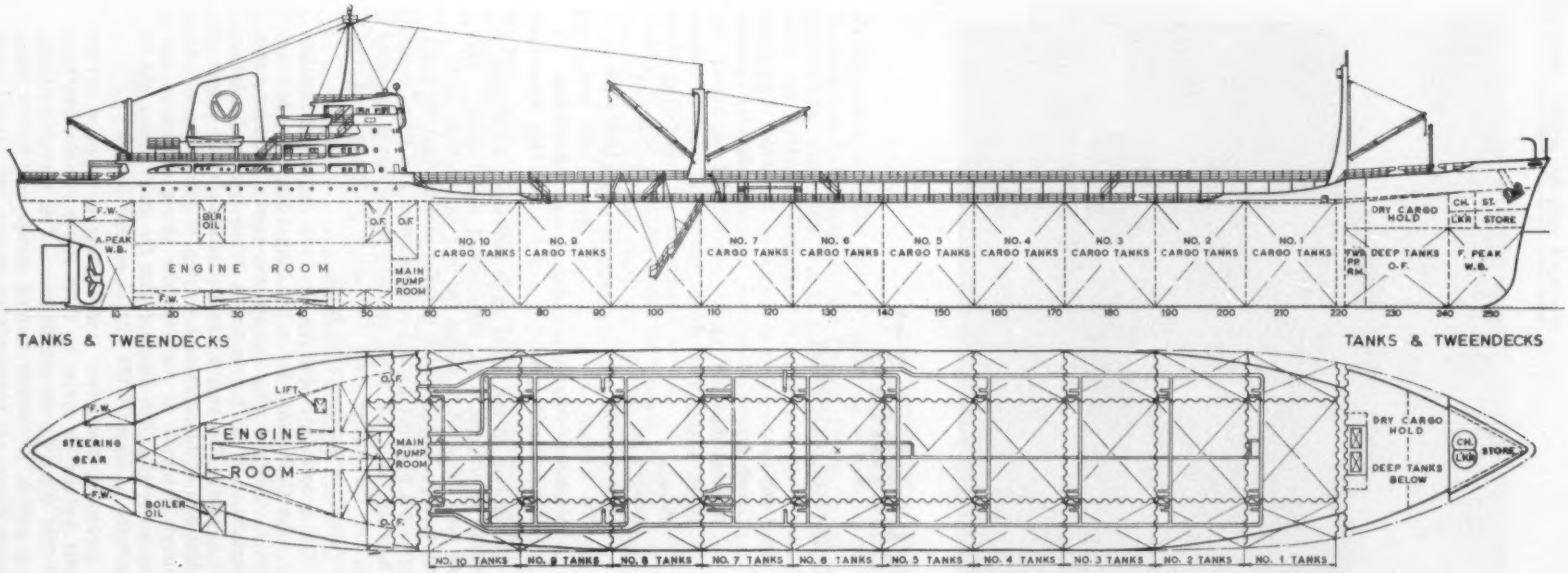
The cargo tanks, which number 10 centre and 20 wing tanks, have a total capacity (98 per cent filled) of about 1,500,250 cu ft. The main pump room is located abaft No 10 tank and contains four Drysdale centrifugal pumps of 1,000 tons/hour capacity (sea water) against a head of 165 lb/sq in. There are also two vertical duplex cargo stripping pumps of 150 tons/hour capacity (water).

From the cargo pumps, four 14-in pipelines run to the deck, where there is a 14-in cross-over amidships for shore connections. From the deck main lines 14-in direct filling lines are connected with main lines in the cargo tanks. The sea water and suction cross-over in the main pump room is of 16in dia. From the cargo pumps four 16-in main suction lines are laid through the cargo tanks, and from these lines cross-overs are led to the opposite main lines: these cross-overs are of 16in dia. between the main line and the first suction branch, 14in dia. between the first suction branch and the centre tank suction and 10in dia. in the remainder.

As previously mentioned, the cargo pumps are driven by the diesel engines which drive the ship's alternators, through Lohmann & Stolterfoht step-up gearing; the diesel engines run at 450 rpm and the pumps at 1,800 rpm. This gear unit has the shafts one above the other with single-helical gears. An Air-flex type pneumatic coupling made by Lohmann & Stolterfoht is fitted between the alternator and the gearbox. Each Air-flex coupling has a built-in flexible coupling. This arrangement avoids critical torsional vibrations in the speed range of the pumps, and enables them to be engaged or disengaged quickly. A compressed air-operated shifting and control device gives safe working conditions for the entire installation.

Propelling Machinery

The propelling machinery in the *Barendrecht* consists of a Schelde-Sulzer single-acting two-stroke turbocharged diesel engine type 12RD76, and as has been stated this is the largest marine diesel engine yet built in Europe. This engine has twelve cylinders of 760mm bore and 1,550mm stroke and a rated output of 15,600 shp at 119 rpm.



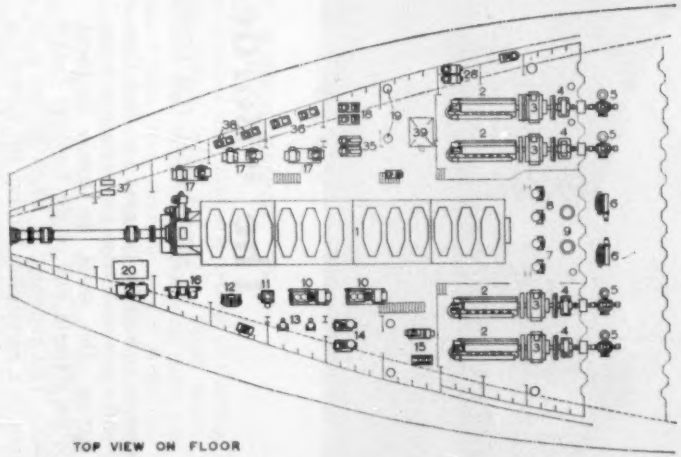
Profile of the oil tanker "Barendrecht," 32,000 dwt, built by NV Koninklijke Maatschappij "De Schelde," Flushing, for Phs. van Ommeren NV, Rotterdam

Electricity Supply

Electricity for power and lighting is supplied by four diesel-driven alternators located at the forward end of the engine room. Each alternator is driven by a Sulzer turbo-charged four-stroke diesel engine having a continuous output of 800 bhp at 450 rpm. The alternators have been supplied by Heemaf N.V., Hengelo, and comprise four self-regulated compound 3-phase AC sets of 530 kVA, 0.8 pf, 425 kW, 450 volts, 60 cycles at 450 rpm.

A point of interest is that since the alternators are in between the diesel engines and the main cargo pumps it was found advisable not to fit belt-driven exciters. Another reason for choosing self-regulated and compounded 3-phase alternators, without rotary exciters, was that it enabled motors up to 100 hp to be started direct to line on one alternator, with about 15 per cent voltage dip.

At sea one alternator is kept in service. During cargo discharging one or two sets are kept at constant speed for simultaneous electric current supply, while the remaining two sets can be varied in speed. With one alternator in operation at sea and with the anticipated load, the engine load will be 60 to 70 per cent of the full load capacity.

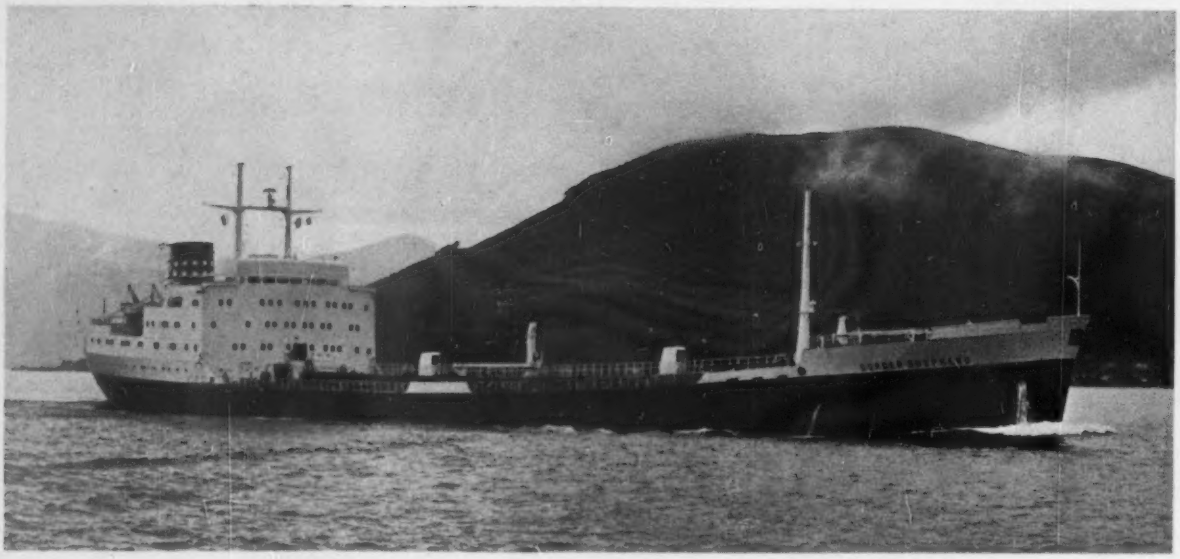


TOP VIEW ON FLOOR

Machinery arrangement in the "Barendrecht"

1 Main engine
2 Auxiliary engines
3 425-kW alternators
4 Gearing, 450/1,800 rpm
5 Cargo oil pumps
6 Stripping pumps
7 Main F.W. and C.W. pumps
8 Sea water cooling pumps
9 F.W. coolers
10 Air compressors
11 Air pump
12 Tank cleaning pump
13 Gen. service pumps
14 Lub. oil purifiers
15 O.F. transfer pumps
16 Feed pumps
17 Lub. oil pumps
18 O.F. valve cooling pumps
19 Lub. oil coolers
20 Hotwell
21 Observation tank
28 Sanitary pumps
35 Booster pumps
36 Domestic water pumps
37 Refrig. plant C.W. pumps
38 Drinking water pumps
39 Lift

Notable Ships of the Year—8



The "Border Shepherd"

NEW VESSEL FOR LOWLAND TANKER COMPANY

THE FIRST vessel to be built by Lithgows Ltd, Port Glasgow, with the entire accommodation and navigating bridge aft entered service. This vessel, the *Border Shepherd*, 19,750 dwt, is the eleventh ship of the Lowland Tanker Company's fleet. This company, in which BP has a 50 per cent interest, is a partnership between BP Tanker Co Ltd, Common Bros Ltd, and Matheson & Co Ltd. The managers of the company are Common Bros Ltd. A feature of the new ship is the Schat oil hose davit which has been mounted in the centreline of the ship and serves both port and starboard sides. (*SW*, 31.8.60.) The davit is driven by compressed air, and replaces the conventional derrick and samson post powered by the warping winch or capstan normally fitted on each side of the ship.

The *Border Shepherd* is the first of five motor vessels of similar tonnage, each with the superstructure aft, on order for the Lowland Tanker Company. The BP Tanker Company also has on order a motor tanker of 35,000 dwt with superstructure aft.

Cargo Tanks

The *Border Shepherd* has 27 tanks for the carriage of oil cargo, and in order to protect these tanks against corrosion the deck head and a depth of 3ft down all bulkheads has been shot-blasted and coated with Camkote. Centre tanks Nos 1, 2, 3, 5, 7 and 9, as well as wing tanks Nos 2, 4 and 6, are also used for water ballast and are cathodically protected. The oil cargo and bunker heating coils are Yorcalbro aluminium brass.

The cargo piping system consists of three 12-in bore lines, and the cargo is handled by three vertical duplex pumps supplied by J. P. Hall & Sons Ltd. Each pump is capable of delivering 500 tons/hr (water) against a discharge pressure of 100 lb/sq in. Each tank is fitted with a 4ft dia. patent swivel gear hatch cover supplied by Cowal Engineering Co Ltd.

The principal particulars of the *Border Shepherd* are as given in the next column:

Length o.a.	572ft
Length b.p.	540ft
Breadth, moulded	72ft
Depth, moulded	40ft
Draught	31ft 7½in
Deadweight	19,750 tons
Gross tonnage	13,600 tons
Net tonnage	7,679 tons
Machinery output	8,800 bhp
Designed trial speed	15½ knots

In addition to the Schat davit previously mentioned, a feature of interest is the streamlined signal mast. This has been designed to utilise the two engineroom vents; a crosstree platform extends between and beyond the posts, forming a platform for the radar scanner and signal lights. There are also two Schat special-purpose davits mounted aft on the bridge deck for stores handling, and two mounted on the forecastle head.

The propelling machinery has been made and installed by John G. Kincaid & Co Ltd, Greenock, and comprises one six-cylinder single-acting two-stroke opposed-piston Harland & Wolff-Burmeister & Wain type turbocharged oil engine. This engine has a maximum rated output of 8,800 bhp at 116 rpm and an mip of 106 lb/sq in. Although designed to maintain the above output in continuous service, it is intended that the main engine will be operated at about 8,500 bhp in normal service.

Electricity for power and lighting is supplied at 440 volts 3-phase 60 cycles by three Ruston & Hornsby type 7VEBZ diesel-driven alternators. The seawater circulating pumps, freshwater cooling pumps and forced lubrication pumps are independently driven; two pumps being provided for each of these respective services. Most of the pumps have been supplied by Drysdale & Co Ltd. The G.E.C. main and sub-switchboards have been supplied by Muir Goodfellow & Co Ltd.

Notable Ships of the Year—9



Oil Tanker "Derby"

SHIP WITH NEW TYPE H.P. TURBINE CASING

AN OIL tanker of 48,884 dwt was delivered to the Charter Shipping Co Ltd (managers, the Federal Steam Navigation Co Ltd), one of the P & O group of companies. This vessel, the *Derby*, was built by John Brown & Co. (Clydebank) Ltd, and is of particular interest in that she contains several new features. Prominent among these is a new design of HP turbine casing which has been developed by John Brown and which is an alternative to the double-casing designs at present in use. It will be remembered that a double-casing HP steam turbine was developed about five years ago by PAMETRADA (*SW*, 19.10.55), and the first of these was installed in the *Caltex Edinburgh* (*SW*, 9.7.58).

In addition to new developments in the propelling machinery, the *Derby* has a number of pneumatically-operated cargo valves and each cargo tank has been fitted with ullage indicators. The fitting of either pneumatically or hydraulically-operated remote cargo valve control is under serious consideration by tanker owners, and one vessel, the *Altair* (*SW*, 9.9.59), has centralised control of all the cargo tank valves. The British tanker *Esso Canterbury* also has a remote control system using air from the main engine starting tanks.

In size the *Derby* is almost identical in length and beam to the *British Queen* (*SW*, 27.1.60), but while the *British Queen* has the greater deadweight, the newer ship has a higher machinery output and higher service speed. Another feature of interest is the location of the boilers, which are positioned on a flat at the forward end of the engine room: in oil tankers these are usually arranged at the after end.

Length o.a.	760ft
Length b.p.	725ft
Breadth, moulded	97ft 2in
Depth to upper deck	52ft
Draught	39ft $5^{13}/_{16}$in
Deadweight	48,884 tons
Gross tonnage	31,791 tons
Machinery output (service) ...	18,000 shp
Service speed	16½ knots
Cargo capacity	2,168,360 cu ft

The *Derby* has been constructed on the combined longitudinal and transverse system of framing, with three longitudinal bulkheads. The cargo space has been divided into 36 tanks. Three wing tanks port and starboard have been arranged as dry tanks, the remaining twelve centre and eighteen wing tanks having a total capacity of 2,168,360 cu ft.

The cargo is handled by four steam turbine-driven horizontal pumps, each of 1,380 tons/hr capacity, and by two vertical stripping pumps each of 330 tons/hr capacity. A ballast and an oil fuel transfer pump have been fitted in the forward pump room.

The propelling machinery in the *Derby* consists of a set of geared impulse-reaction PAMETRADA type steam turbines driving a single screw. The turbines were built by John Brown and are capable of developing a service output of 18,000 shp at 101.4 rpm of the propeller, and have a maximum output of 20,000 shp at 105 propeller rpm.

To achieve a simple and reliable unit, easily operable and maintained by the ship's engineers a simple feed cycle was chosen, with the provision only of a single bleed point taken from between the HP and LP turbines. This greatly simplified the turbine casing design, and the higher efficiency which could have been achieved by additional bleed points was considered as being of secondary importance to the simplicity of operation and control. Steam is supplied at 600lb/sq in and superheated to 860 deg F.

Particular novelty attaches to the design of the HP turbine casing, and this is an alternative to the double-casing designs at present in use. The main feature of the latter was to obtain a reduced drop in the temperature across the inner casing and uniform temperature conditions around the body of the inner casing in order to obtain minimum distortion of the turbine body. The double-casing arrangement, however, does introduce certain complications in construction. The alternative John Brown design employed in the *Derby* is of the single-casing type. A particular uniform shape has been achieved and this in turn gives equal temperature gradients of the top and bottom halves of the cylinder.

Notable Ships of the Year—10

Cargo Liner "Bandeirante"

NEW VESSEL FOR FRED. OLSEN & COMPANY

THE Norwegian shipowners Fred. Olsen & Company took delivery of a new cargo liner, the *Bandeirante*, 9,470 dwt, built by the Netherlands Dock & Shipbuilding Company, Amsterdam. She is on time charter to the Norwegian South America Line. A prominent feature of the new ship is the typical Olsen streamlined funnel with built-in mast. The arrangement of the refrigerated cargo compartments is unusual, with side holds served by separate hatches. Noticeable too is the absence of masts and samson posts. the entire cargo handling being effected by deck cranes.

It is of interest that the *Bandeirante* is powered by the first engine to be built by N.D.S.M. under licence from Götaverken. Her speed on trials with a draught of 25ft 6in and with the main engine developing 7,510 bhp was about 17¼ knots. As will be seen from the profile drawing, the machinery and the entire accommodation has been arranged well aft.

The principal particulars of the *Bandeirante* are as follows:—

Length o.a.	472ft 4in
Length b.p.	432ft 6in
Breadth, moulded	60ft 9in
Depth to upper deck	38ft
Depth to upper tweendeck ...	28ft 6½in
Constructional draught	28ft 6in
Corresponding deadweight ...	9,470 tons
Designed draught	25ft 6in
Gross tonnage	8,189 tons
Net tonnage	4,519 tons
Machinery output	7,500 bhp
Service speed	16.75 knots

The *Bandeirante* has been designed for the carriage of general cargo and grain and, in addition, has eight compartments for the carriage of frozen or refrigerated cargo.

There are five holds, four forward and one abaft the engine room. The reason for placing the engine room well aft is that it enables large holds to be arranged forward. No 1 hold is divided by the upper tweendeck, and in the lower hold the ship's sides and bulkheads have been sheathed so that hides may be carried. Nos 2, 3 and 4 holds are divided into an upper and lower tweendeck and a lower hold.

It will be noted that the wings of Nos 3 and 4 tweendecks have been arranged as refrigerated compartments. An unusual feature of the cargo arrangements is that the casing between these refrigerated compartments, as well as Nos 3 and 4 lower holds, is used for the carriage of general cargo or grain. No 5 hold abaft the engine room has no lower holds, this space being taken up by the tunnel wing tanks. The trunk above this space formed by the poop is used for the stowage of cargo.

Refrigeration Equipment

The air in the refrigerated compartments is cooled by direct expansion of Freon 22. There are four 3-cylinder STAL compressors having the following characteristics:—

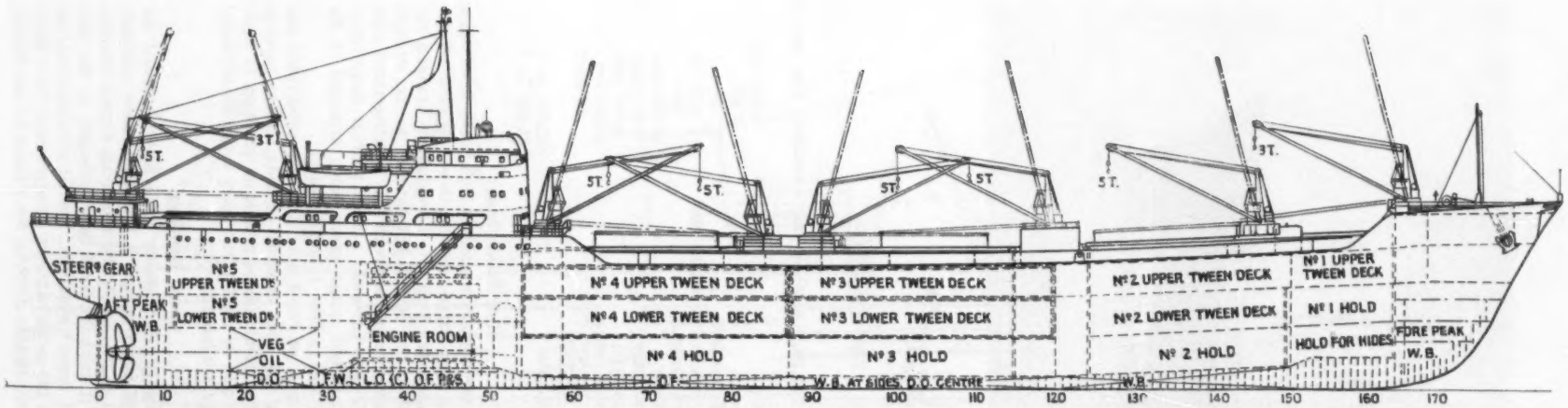
	Capacity (BTU)	RPM	Condens. temp.	Evap. temp.
Normal cooling	416,000	575	30 deg C	−15 deg C
Frozen meat	254,080	575	30 deg C	−25 deg C

These capacities are such that under tropical conditions, i.e., with an air temperature of 40 deg C and a cooling water temperature of 30 deg C, three compressors can maintain a temperature of −20 deg C in all compartments when fully loaded and with sufficient air circulation.

All the upper deck hatches have been provided with MacGregor steel covers of the single-pull type which are opened and closed by means of the travelling deck cranes, whose platforms form part of the hatch covers. The first Olsen ship to have this arrangement was the *Burrard* (*SW*, 21.11.56). Nos 3 and 4 tweendeck hatches have steel folding covers and these two are operated by crane. The remaining hatches are provided with steel pontoon covers.

For cargo handling there are three travelling 5-tons





General arrangement of the cargo liner "Bandeirante," 9,470 dwt, built by the Netherlands Dock & Shipbuilding Company, Amsterdam, for Fred. Olsen & Company

cranes, three fixed 5-tons cranes and two fixed 3-tons cranes, all of ASEA make. The 5-tons cranes have a maximum load at a hoisting speed of 30 metres/min, and the 3-tons cranes at 40 metres/min.

The propelling machinery in the *Bandeirante* consists of a six-cylinder two-stroke N.D.S.M.-Götaverken engine, type 760/1500 VGS6U, having a maximum output of 7,500 bhp at 112 rpm. The engine is fitted with two Napier turbochargers and is designed to run on diesel oil or fuel oil having a viscosity of 1,500 secs. Redwood No 1 at 100 deg F.

ORDINARY CARGO

Compartment	Frame No	Grain cu ft	Bale cu ft
No 5 trunk-poop	10– 24	8,232	8,016
Strong room	3– 10	4,986	4,206
Strong room	24– 27	960	798
Total poop		**14,178**	**13,020**
No 1 upper tw. deck	150–169	17,516	15,909
No 2 upper tw. deck	120–150	47,194	44,606
No 3 (trunk) U.T.D.	87–120	19,690	19,200
No 4 (trunk) U.T.D.	54– 87	18,650	18,200
No 5 upper tw. deck	10– 31	29,216	26,881
Total U.T.D.		**132,266**	**124,796**
No 2 lower tw. deck	120–150	46,269	42,828
No 3 (trunk) L.T.D.	87–120	18,730	18,080
No 4 (trunk) L.T.D.	54– 87	18,550	17,910
No 5 lower tw. deck	10– 29	14,126	12,215
Total L.T.D.		**97,675**	**91,033**
No 1 hold (for hides)	150–164	14,710	14,500
No 2 hold	120–150	39,206	35,024
No 3 hold	87–120	56,941	51,411
No 4 hold	54– 87	56,390	50,888
Total holds		**167,247**	**151,823**
Grand total ordinary cargo		**411,366**	**380,672**
Refrigerated spaces		99,080	99,080
Grand total incl. refrigerated spaces		**510 446**	**479,752**

CAPACITIES OF TANKS

Compartment	Frame No	100% capacity cu ft	Tons fuel oil at 38 cu ft/t	Tons diesel oil at 40.5 cu ft/t	Tons lubr. oil at 39 cu ft/t	Tons freshwater at 36 cu ft/t	Tons ballast W. at 35 cu ft/t
Fore peak	164–stem	10,382	—	—	—	—	296.6
D.B. tank No 1	150–164	4,086	—	—	—	—	116.7
D.B. tank No 2 P & S	120–150	11,866	—	—	—	—	339.0
D.B. tank No 3	100–120	4,400	—	1,065	—	—	—
D.B. tanks No 3 P & S	100–120	4,174	—	—	—	—	119 2
D.B tanks No 4 P & S	82–100	8,250	212.6	—	—	—	—
D.B. tanks No 5 P & S	53– 81	11,922	307.4	—	—	—	—
D.B. tanks No 6 P & S	31– 53	5,522	142.2	—	—	—	—
D.B. lubr. O. sump t.	34– 45	1,236	—	—	31.0	—	—
D.B. lubr. O. sep. t.	45– 48	335	—	—	8.4	—	—
D.B. tank No 7	29– 33	897	—	—	—	24.9	—
D.B. tank No 8	18– 28	1,183	—	28.6	—	—	—
Aft peak	0– 10	2,497	—	—	—	—	70.8
Tw. d. lubr. o. stor. t.	45– 52	1,608	—	—	40.2	—	—
Tw. d. freshw. aft S	5– 10	2,087	—	—	—	57.9	—
Tw. d. freshw. t. aft P	5– 10	1,861	—	—	—	51.7	—
Tw. d. f. d. settl. tk. S	31– 35	865	22.2	—	—	—	—
Tw. d. dirty oil settl. tk. S	35– 40	833	22.7	—	—	—	—
Tw. d. clean oil settl. tk.	31– 34	833	21.4	—	—	—	—
Tw. d. dies. oil settl. t. P	31– 34	508	—	12.2	—	—	—
Totals			**728.5**	**147.3**	**79.6**	**134.5**	**942.3**

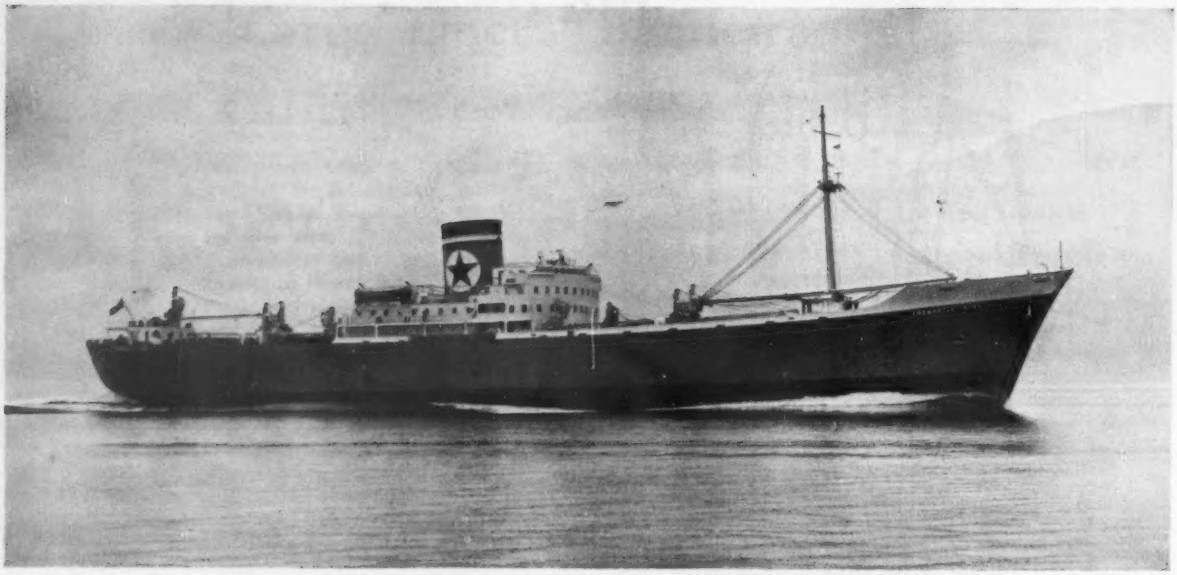
REFRIGERATED CARGO

Compartment	Frame No	Grain M³	Grain cu ft	Bale M³	Bale cu ft
A	87–120	343.0	12,130	343.0	12,130
B	87–120	341.8	12,070	341.8	12,070
C	87–120	369.3	13,040	369.3	13,040
D	87–120	367.0	12,960	367.0	12,960
E	54– 87	330.1	11,660	330.1	11,660
F	54– 87	330.1	11,660	330.1	11,660
G	54– 87	365.2	12,900	365.2	12,900
H	54– 87	358.0	12,660	358.0	12,660
Total		**2,805.5**	**99,080**	**2,805.5**	**99,080**

VEGETABLE OIL IN WING TANKS

Compartment	Frame No	100% capacity M³	100% capacity cu ft	Tons at 39 cu ft/t
SB tank	18–29	92.7	3,273	83.9
PS tank	21–29	70.6	2,493	63.9
Total		**163.3**	**5,766**	**147.8**

Notable Ships of the Year—11



The "Fremantle Star"

REFRIGERATED CARGO SHIP FOR BLUE STAR LINE

DURING the summer the Blue Star Line Ltd, London, took delivery of a large refrigerated and general cargo vessel designed for their Australian and New Zealand service. This vessel, the *Fremantle Star*, 12,150 dwt, was built by Cammell Laird & Co (Shipbuilders) Ltd, and was launched on 30 December 1959 by Mrs William Vestey. Although similar in construction to the German-built vessels of the *Canberra Star* class, the *Fremantle Star* is for a British ship unique, so far as cargo handling facilities are concerned, in that she has been equipped with nine ASEA deck cranes.

The use of deck cranes is by no means new, and some foreign ships have been fitted with as many as 14 deck cranes, but the *Fremantle Star* is the first British-built vessel to be equipped with more than five. It will be remembered that the cargo vessels *Bulimba* (*SW*, 15.4.59) and *Bankura* (*SW*, 16.9.59), were each fitted with five ASEA deck cranes.

Special Features

Also of interest is the fact that the vessel has been fitted with both insulated and non-insulated hydraulically-operated hatch covers of a type now being supplied by Greer Marine Ltd, London. The cover, known as the Hydro hatch, was originally designed in France and has been manufactured in the United States of America for some years. The first British-built covers of this type were fitted to the Lamport & Holt vessel *Chatham*, delivered earlier this year. Hydro hatch covers were also fitted on board the passenger liner *Windsor Castle* also built at Cammell Laird's yard at Birkenhead.

Designed for the carriage of mixed cargoes of frozen meat, fruit and dairy produce, with general cargoes of wool, etc, the *Fremantle Star* has a speed of 18 knots in service. The propelling machinery, which consists of an eight-cylinder Harland & Wolff diesel engine, has an output of 11,500 shp in service.

The principal particulars of the *Fremantle Star* are as follows:—

Length o.a.	518ft 10in
Length b.p.	470ft
Breadth, moulded	70ft
Depth, moulded to shelter deck	45ft 9in
Draught, summer	30ft
Deadweight	12,150 tons
Gross tonnage	8,403 tons
Net tonnage	4,949 tons
Machinery output	11,500 shp
Service speed	18 knots
Cargo capacity:	
Refrigerated	332,000 cu ft
Bale	345,400 cu ft

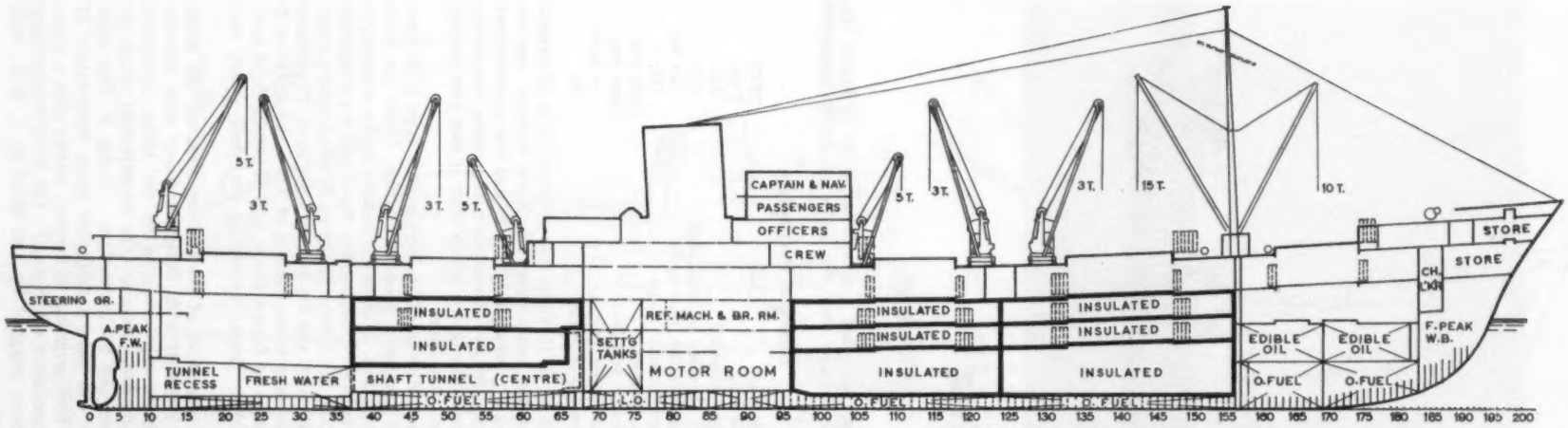
Hull Subdivision

There are seven main watertight bulkheads subdividing the hull into five cargo spaces, three forward of the machinery space and two aft. Longitudinal framing has been adopted in the double bottom and at the strength deck. Although mainly constructed as a refrigerated ship, the *Fremantle Star* has quite a large general cargo-carrying capacity, general cargo space being arranged in the shelter decks and in Nos 1 and 5 holds.

The lower part of No 1 hold has been subdivided into four tanks of 510 tons capacity suitable for the carriage of latex, tallow, edible oil or petroleum products in bulk: the tanks can also be used to carry dry cargo should liquid cargoes not be available.

Cargo Handling

The remaining cargo spaces have been insulated for the carriage of frozen cargo. A low temperature compartment of 3,950 cu ft capacity and a separate frozen chamber of 3,450 cu ft capacity have been arranged at the port side of No 3 upper tweendeck. Special consideration has been given to the cargo handling arrangements. No 1 hatch is served by two 10-tons derricks, No 2 hatch by two 15-tons



Profile of the refrigerated and general cargo vessel "Fremantle Star," 12,000 dwt, built by Cammell Laird & Co (Shipbuilders & Engineers) Ltd, for the Blue Star Line Ltd, London

derricks and also a 3-tons traversing crane. Nos 3 and 4 hatches are both served by two 5-tons fixed cranes and a 3-tons traversing crane, while No 5 hatch has a 3-tons traversing and a 5-tons fixed crane. Each of the traversing cranes is mounted on a carriage designed to run on an athwartships track so that the crane may be positioned on the port or starboard side of the ship as required. The remaining cranes are on fixed mountings.

Each crane has three independent movements—hoisting/lowering, luffing and slewing—and of course, in the case of the four 3-tons cranes, the facility for a fourth movement, namely traversing. The crane post, jib and wire rope system have been designed to provide level luffing, a time-saving feature appreciated by the crane driver.

The cranes on board the *Fremantle Star* were manufactured by ASEA, Sweden, and were supplied to the shipbuilders by Fuller Electric Ltd, London, who are the sole United Kingdom representatives for ASEA.

As stated, the hatch covers are of the Hydro hatch type. These have been supplied by Greer Marine Ltd, London, and are hydraulically-operated.

SUMMARY

Compartment	Insulated	General Bale
Total holds	189,299	90,217
Total lower tween decks	53,334	—
Total upper tween decks	89,366	—
Total shelter tween decks	—	248,337
Forecastle tween decks ...	—	6,890
Grand totals	**331,999**	**345,444**

Compartment	cu ft
Air cooled frozen cap.	324,562
Low temp. comp'ment	3,964
'A' chamber	3,473
Total insulated ...	331,999
General bale	345,444
Grand total	**677,443**

CAPACITIES—CARGO SPACES

Compartment	Insulated Frozen	General Grain	General Bale
No 1 hold, edible oil tank, forward port	—	3,818	2,542
No 1 hold, edible oil tank, forward stbd.	—	4,087	2,842
No 1 hold, edible oil tank, aft port	—	6,357	5,112
No 1 hold, edible oil tank, aft stbd.	—	6,608	5,374
No 1 hold	—	21,846	19,024
No 2 hold	59,646	—	—
No 3 hold	56,842	—	—
No 4 hold	72,811	—	—
No 5 hold	—	62,931	55,323
Total hold	**189,299**	**105,647**	**90,217**
No 2 lower tween decks	26,199	—	—
No 3 lower tween decks	27,135	—	—
Total lower tween decks ...	**53,334**	—	—
No 2 upper tween decks	26,977	—	—
No 3 upper tween decks	18,296	—	—
'A' chamber	3,473	—	—
Low temperature chamber ...	3,964	—	—
No 4 upper tween decks	36,656	—	—
Total upper tween decks ...	**89,366**	—	—
No 1 shelter tween decks	—	28,371	26,012
No 2 shelter tween decks	—	55,273	51,492
Special cargo tween decks	—	1,089	885
No 3 shelter tween decks	—	51,888	48,517
Casing side stbd.	—	17,466	15,931
No 4 shelter tween decks	—	57,468	53,642
Tonnage well	—	5,493	4,757
No 5 shelter tween decks	—	53,356	47,101
Total shelter tween decks ...	—	**270,404**	**248,337**
Forecastle	—	8,160	6,890
Grand totals	**331,999**	**384,211**	**345,444**

CAPACITIES—TANKS

Tank	O.F. tons	D.O. tons	W.B. tons	F.W. tons
No 1 deep tank, forward	134.0	—	149.3	—
No 1 deep tank, aft port	144.1	—	160.6	—
No 1 deep tank, aft stbd.	149.7	—	166.9	—
No 2 D.B. tank, P & S ..	307.4	—	342.4	—
No 3 inner D.B. tank, P & S	157.2	—	175.2	—
No 3 outer D.B. tank, P & S	240.0	—	267.4	—
No 4 D.B. tank, P & S ...	—	178.2	—	—
No 5 D.B. tank, port ...	165.5	—	184.4	—
No 5 D.B. tank, stbd. ...	163.6	—	182.3	—
No 6 D.O. settling tank	—	82.8	—	—
No 6 D.O. bunker ...	—	78.7	—	—
No 6 O.F. settling tank	127.1	—	—	—
No 6 O.F. bunker ...	122.9	—	—	—
No 7 D.B. tank, port ...	185.2	—	206.3	—
No 7 D.B. tank, stbd. ...	192.1	—	214.0	—
No 8 D.B. tank, port ...	—	—	—	169.9
No 8 D.B. tank, stbd. ...	—	—	—	157.4
Aft peak	—	—	87.9	—
Fore peak	—	—	93.5	—
Totals	**2,088.8**	**339.7**	**2,230.2**	**327.3**

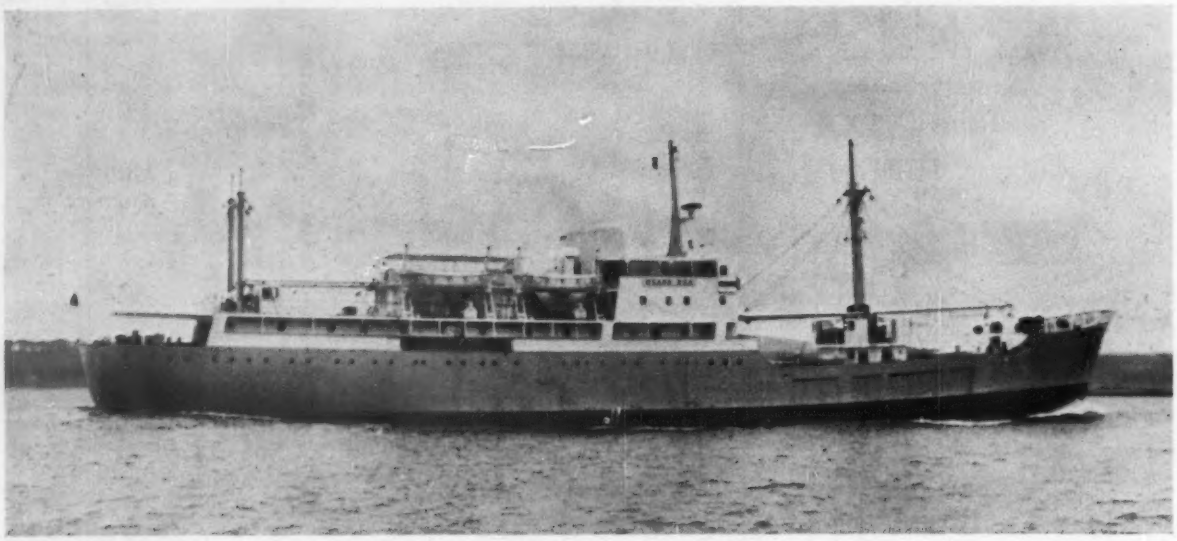
No 1 edible oil tank, forward port	93.6
No 1 edible oil tank, forward stbd.	100.1
No 1 edible oil tank, aft port	155.8
No 1 edible oil tank, aft stbd.	161.9
Total edible oil	**511.4**

Densities:—

Oil fuel	39.0 cu ft/ton
Diesel oil and edible oil	40.0 cu ft/ton
Water ballast	35.0 cu ft/ton
Fresh water	36.0 cu ft/ton

	Summer	Winter
Freeboard	4ft 10½in	5ft 6½in
Draught S.W.	30ft 0½in	29ft 4½in
Displacement	18,971	18,522
Deadweight	12,171	11,722

Notable Ships of the Year—12



The "Moana Roa"

MOTOR VESSEL FOR NEW ZEALAND GOVERNMENT

THE New Zealand Government has taken delivery of a twin-screw motor vessel for service between Auckland, New Zealand, and the Cook Islands in the South Pacific. This vessel, the *Moana Roa*, 3,040 grt, was built by the Grangemouth Dockyard Co Ltd, Scotland; Sir J. H. Biles & Company, London, the consultant naval architects for the New Zealand Government, supervised the construction of the ship. The *Moana Roa* replaces the 33-years old *Maui Pomare*—named after the late Sir Maui Pomare, a Maori doctor who became a Cabinet Minister in New Zealand.

The entry into service of the new ship is not only of the utmost importance in the economic development of the Cook Islands, but also sets a new high standard for travel in the important inter-island services of the New Zealand Government in the South Pacific. She will be able to handle much faster, and better, the perishable, seasonal and varied export crops of the Cook Islands, which require adaptability of cargo space and temperature range.

Special Requirements

With the main port, Avarua, on Raratonga Island, 1,650 nautical miles from Auckland, and a total population of only 17,000, the Cook Group is not large enough to attract either an adequate international shipping service by overseas vessels or a regular service by New Zealand operators. The need is, therefore, for a vessel to cope with heavy exports for a limited season, as well as providing economically facilities all the year round for passengers and general imports and exports.

The principal exports of the Cook Islands are fruit—mainly oranges and tomatoes—pearl shell, copra and manufactured apparel, the total annual value of exports being over £500,000. The value of imports, which consists mainly of foodstuffs, exceeds £750,000 a year, mostly coming from New Zealand with the United Kingdom as the next largest supplier.

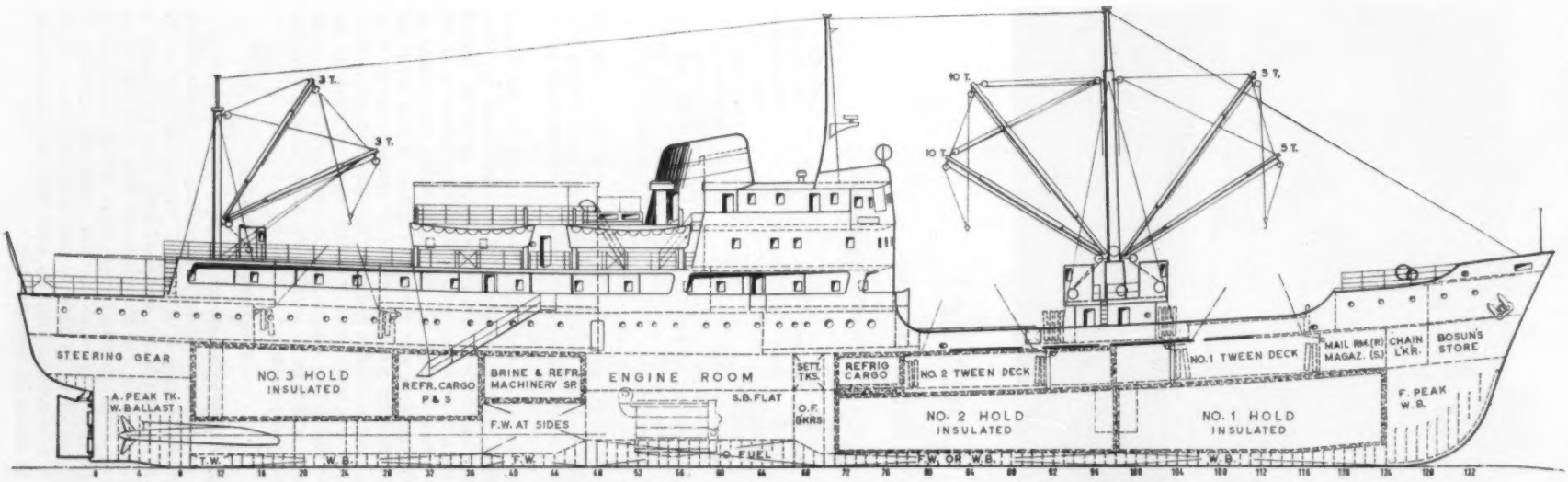
The *Moana Roa* is powered by two Clark-Sulzer diesel engines which give her a service speed of 14 knots. On sea trials in ballast over the Firth of Forth measured mile a speed of 15.12 knots was attained. It is of interest to note that her predecessor, the *Maui Pomare*, was by way of being a pioneer in her class, and was a twin-screw vessel powered by two crankcase compression two-stroke Vickers-Petters oil engines, which were at that time among the largest of their kind.

Principal Particulars

Length o.a.	297ft
Length b.p.	270ft
Breadth, moulded	46ft
Depth, moulded to main deck ...	22ft
Draught loaded, passengers ...	16ft 9in
Draught loaded, cargo	17ft
Gross tonnage	3,050 tons
Machinery output	3,080 bhp
Service speed	14 knots
Passengers, in berths	40

The *Moana Roa* is of the single deck type with forecastle and a combined poop and bridge. There are three insulated holds and, in addition, lockers in the tweendecks for small perishable consignments. No 1 hold has a capacity of 15,100 cu ft, No 2 hold 22,600 cu ft, No 3 hold a capacity of 14,100 cu ft and the lockers 5,200 cu ft. In addition there are two deep-freeze lockers of 7,000 and 3,000 cu ft for the carriage of frozen foods, and 18,000 cu ft of non-insulated cargo space, excluding the mail room and magazine.

With the exception of No 1 tweendeck, all the holds have been insulated with fibreglass loose wool covered with aluminium alloy sheeting by the Miller Insulation & Engineering Ltd, Glasgow. The temperatures of all the cargo lockers can be lowered to −5 deg F. The main cargo holds will have a minimum space temperature of 35 deg F when operating in tropical waters with a mean ambient temperature of 95 deg F. The brine refrigerating plant has been supplied by and fitted by J. & E. Hall Ltd, Dartford.



Profile of the twin-screw passenger and refrigerated cargo vessel "Moana Roa," 3,040 grt, built by the Grangemouth Dockyard Co Ltd, Scotland, for the New Zealand Government

Cargo handling is by means of two 10-tons and two 5-tons derricks on the steel mast mounted forward, and by two 3-tons derricks on posts mounted aft. The six winches are of the Laurence Scott self-contained Selector type. The windlass and capstan have been supplied by Clarke, Chapman & Co Ltd.

Accommodation has been provided for 40 passengers, and there are 14 two-berth cabins and three four-berth cabins arranged on the bridge and boat decks, all suitably ventilated for both tropical and temperate conditions. On the main deck there is a large dining saloon and on the deck above an attractively furnished lounge with a cocktail bar. The deck officers and engineers have been accommodated on the boat deck and bridge deck respectively.

Propelling Machinery

The propelling machinery in the *Moana Roa* consists of two Clark-Sulzer, turbocharged, single acting, trunk piston diesel engines type TAD 36, having seven cylinders of 360 mm bore and 600 mm stroke. The total output of the two engines is 3,080 bhp at 250 rpm. They have been built by George Clark (Sunderland) Ltd. A feature of the installation is the compactness of the machinery space which occupies only twenty frame spaces, including the layout of the four auxiliary generators, pumps, switchboard, etc.

FUEL OIL

Compartment	Frames	Gross cu ft	98% cu ft	98% tons at 42
No 3 double bottom diesel oil tank, port	48 to 70	3,715	3,640.70	86.68
No 3 double bottom diesel oil tank, stabd.	48 to 70	3,855	3,777.90	89.94
Diesel oil cross bunker port	67 to 70	1,994.60	1,954.70	46.55
Diesel oil cross bunker, stbd.	67 to 70	1,994.60	1,954.70	46.55
Diesel oil service tank, centre port	67 to 70	517.50	507.14	12.08
Diesel oil service tank, centre stabd.	67 to 70	517.50	507.14	12.08
Total		**12,594.20**	**12,342.28**	**293.88**
Diesel oil double bottom drain tank, port	65 to 67	136.00	130.61	3.11

LUBRICATING OIL

Compartment	Frames	Gross cu ft	98% cu ft	98% tons at 40
No 4 double bottom tank, centre aft.	48 to 52	328.91	322.33	8.04
No 4 double bottom tank, centre fwd.	52 to 55	243.14	238.28	5.96
Clean tank, stbd.	—	100.24	98.24	2.46
Total		**672.29**	**658.85**	**16.46**
Dirty tank, stbd.	—	77.96	76.40	1.91

WATER BALLAST

Compartment	Frames	cu ft	tons at 35
No 1 double bottom tank, port	98 to 124	1,287.30	36.77
No 1 double bottom tank, stbd.	98 to 124	1,287.30	36.77
No 2 double bottom tank, port	71 to 98	2,398.30	68.53
No 2 double bottom tank, stbd.	71 to 98	2,450.00	70.04
No 6 double bottom tank, port	13 to 37	1,052.10	30.07
No 6 double bottom tank, stbd.	13 to 37	1,052.10	30.07
Aft peak tank	AP to 9	1,975.30	56.44
Fore peak tank	124 to Stem	2,119.90	60.57
Total		**13,622.30**	**389.26**

REFRIGERATED CARGO at—5 deg° F

Compartment	Frames	cu ft
No 2 tween deck locker, aft.	71 to 77/78	2,957
No 2 tween deck locker, port	77/78 to 98	2,290
No 2 tween deck locker, stbd.	77/78 to 98	2,691
No 3 cargo locker, port	28/29 to 37	3,508
No 3 cargo locker, stbd.	28/29 to 37	3,302
Total		**14,748**

REFRIGERATED STORES

Compartment	cu ft
Meat room	423.00
Vegetable room	520.00
Dairy room	184.00
Fish room	95.00
Total	**1,222.00**

REFRIGERATED CARGO at +35 deg F

Compartment	Frames	cu ft
No 1 cargo hold	98 to 124	15,238
No 2 cargo hold	71 to 98	22,438
No 3 cargo hold	9 to 28/29	15,021
Total		**52,697**

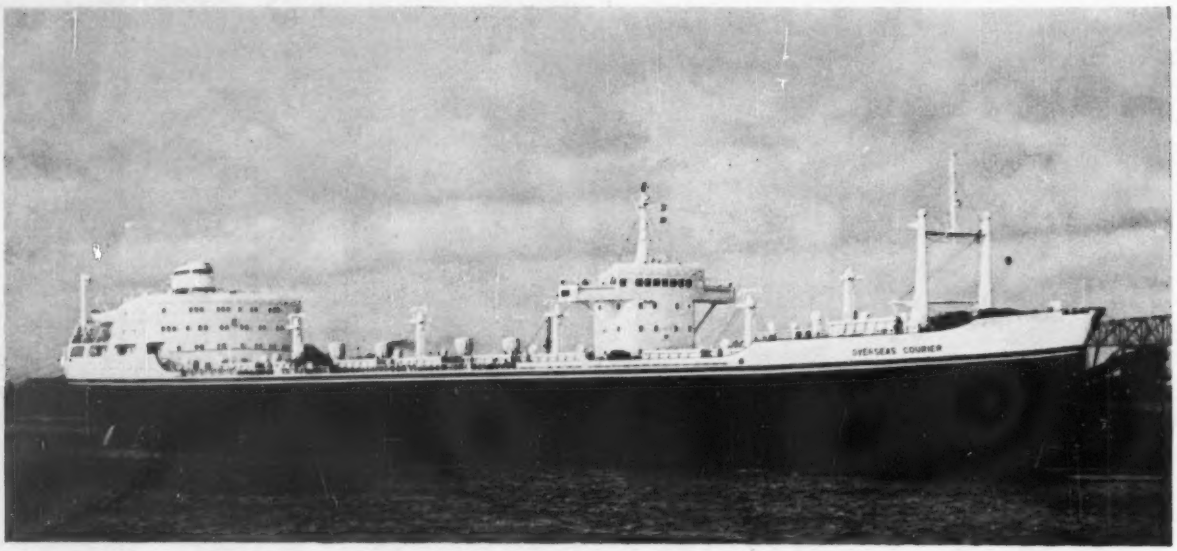
NON-REFRIGERATED CARGO

Compartment	Frames	Grain cu ft	Bale cu ft
No 1 tween deck	98 to 117/118	12,158	10,889
No 2 tween deck hatch trunk	77/78 to 93	7,001	6,843
Mail room, port	117/118 to 124	1,225	1,084
Magazine, stbd.	117/118 to 124	—	837
Total		**20,384**	**19,653**

FRESH WATER

Compartment	Frames	cu ft	tons at 36
No 2 double bottom tank, port	71 to 98	2,398.30	66.62
No 2 double bottom tank, stbd.	71 to 98	2,450.00	68.08
No 5 double bottom tank, port	37 to 47	983.20	27.32
No 5 double bottom tank, stbd.	37 to 47	983.20	27.32
Tunnel side tank, port	37 to 47	2,579.50	71.66
Tunnel side tank, stbd.	37 to 47	2,579.50	71.66
Total		**11,973.70**	**332.66**
Main engine header tank	—	61.90	1.72

Notable Ships of the Year—13



The "Overseas Courier"

GERMAN-BUILT BULK CARRIER FOR BRITISH OWNERS

THE GERMAN shipbuilders, Rheinstahl Nordseewerke GmbH, Emden, completed a large bulk carrier for London & Overseas Bulk Carriers Ltd, Bermuda. This vessel, the *Overseas Courier*, 27,650 dwt, is the largest vessel yet built at the Emden shipyard: her design has been based on the experience gained with the smaller bulk carriers of the *Rheinstahl* class, details of which were given in THE SHIPPING WORLD of 12 November 1958. The arrangement of nine cargo holds, location of the engine room aft and accommodation for the entire crew aft has been maintained. However, on account of the greater length, a small bridge house has been erected forward of amidships, and the pump room containing the ballast pumps has been arranged directly below the bridge house instead of right forward, as is the case in the *Rheinstahl* class ships.

Principal Particulars

Length o.a.	636ft 8⅛in
Length b.p.	598ft 4in
Breadth, moulded	79ft 8¾in
Depth to main deck	49ft 4½in
Draught	34ft 7½in
Deadweight	27,814 tons
Gross tonnage	20,205 tons
Net tonnage	13,718 tons
Machinery output	7,860 shp
Service speed	14½ knots
Hold capacity	1,262,547 cu ft

Arrangement of Holds

The nine holds have been so constructed that all kinds of cargo may be carried without the necessity of erecting such special fittings as grain feeders. The hold bulkheads and the hull structure are sufficiently strong to allow ore to be carried in alternate holds, i.e. Nos 1, 3, 5, 7 and 9, which can be filled completely, so that when carrying this cargo the metacentric height of the vessel is kept down to a comfortable figure.

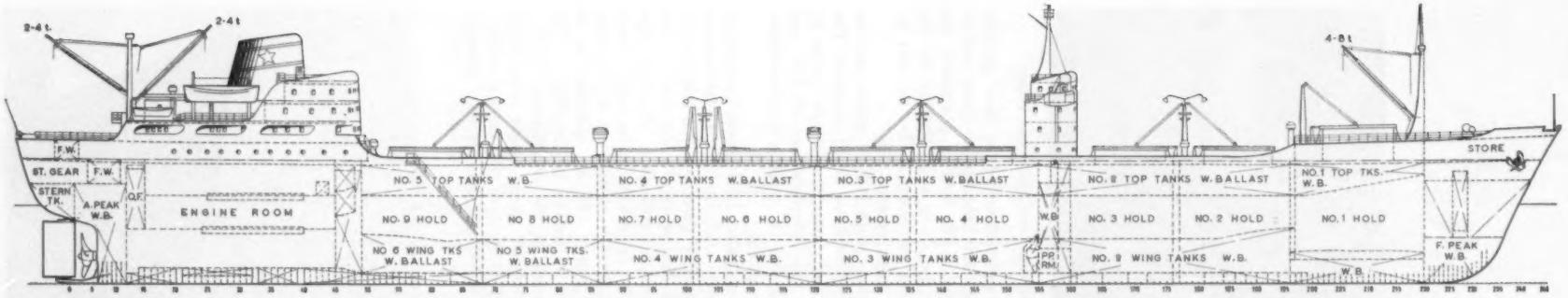
The propelling machinery in the *Overseas Courier* consists of a seven-cylinder diesel engine of 7,860 shp (metric) output, designed to give the ship a trial speed of about 14½ knots. During sea trials off the mouth of the River Ems under somewhat adverse weather conditions an average speed of 15.51 knots was attained. The ship has been very well built and the finish, in particular that of the accommodation, is excellent.

Upper wing tanks are arranged port and starboard throughout the entire length of the vessel, while the lower wing tanks extend from No 2 to No 9 hold, as shown in the accompanying drawing. In No 1 hold the double bottom has been raised and serves as a deep tank. There is a cross bunker for the carriage of heavy oil arranged forward of the engine room, and a cross bunker for the carriage of water ballast arranged amidships between Nos 3 and 4 holds. The transverse bulkheads in the holds are of corrugated construction.

The nine hatchways, which are of equal dimensions and designed to serve as grain feeders, are closed by MacGregor type folding steel covers. These covers are opened by means of wire rope pull, since this has proved to be the most simple method of ensuring opening and closing of hatch covers at any time. The pillars which carry the blocks through which the wires are passed also serve as cargo hold ventilators and carry the lights for the illumination of the cargo holds. Buffer stops arranged at the top of the pillars ensure that the electrical supply to the winches is broken as soon as the hatch covers are in the fully-raised position.

Propelling Machinery

The propelling machinery in the *Overseas Courier* consists of a seven-cylinder single-acting two-stroke MAN diesel engine, type K7Z78/140C, having cylinders of 780 mm bore and a piston stroke of 1,400 mm. The engine is turbocharged by two Brown Boveri type VTR 630 turbo blowers and is designed for an output of 7,860 shp (metric) at 115 rpm. Provision has been made for running on heavy fuel of up to 3,000 seconds Redwood No 1 at 100 deg F. It is estimated that the total daily fuel consumption will be about 30 tons per day.



Profile of the bulk carrier "Overseas Courier," 27,814 dwt, built by Rheinstahl Nordseewerke GmbH, Emden, for London & Overseas Bulk Carriers Ltd, Bermuda

HOLD CAPACITIES: (including hatches)

	Frames	Grain cu m	Grain cu ft	
No. 1 cargo hold, with trunk ...	197–220	3,647	128,794	
No. 2 cargo hold	177–197	4,116	145,357	
No. 3 cargo hold	160–177	3,860	136,316	
No. 4 cargo hold, with deduction for spare propeller	136–155	4,445	156,975	
No. 5 cargo hold	121–136	3,486	123,108	
No. 6 cargo hold	102–121	4,387	154,927	
No. 7 cargo hold	87–102	3,486	123,108	
No. 8 cargo hold	68– 87	4,344	153,408	
No. 9 cargo hold	49– 68	4,202	148,388	
Grand total of holds	...	35,973	1,270,381	
Trunk No. 1 cargo hold	202–214½	226	7,981	
Total of holds without trunk ...	...	35,747	1,262,400	
Capacity of each hatch		123	4,344	

HEAVY OIL: Spec. weight=0,92; 39,0 cf/ts

	Frames	Tank and Bunker Capacities cu m	cu ft	Tons of 1016kg
Cross Bunker (P) ...	45–49	362.0	12,784	327.8
Cross bunker (S) ...	45–49	395.0	13,949	357.7
Daily service tank (P) ...	45–48	33.5	1,183	30.3
Daily service tank (S) ...	45–48	33.5	1,183	30.3
Settling tank (P) ...	45–48	35.6	1,259	32.3
No. 6 D.B.-tank, inside (P)	40–68	115.1	4,063	104.2
No. 6 D.B.-tank, inside (S)	40–68	112.1	3,960	101.5
Total		1,086.8	38,381	984.4
Heavy Oil or Ballast Water				
No. 5 D.B.-tank (P) ...	68–87	140.7	4,969	127.4
No. 5 D.B.-tank (S) ...	68–87	140.7	4,969	127.4
Total of heavy oil		1,368.2	48,319	1,238.9
Heating oil service tank (S)		6.0	212	5.4

OIL FUEL: Spec. weight=0,85; 42,2 cf/ts

High bunker (P) ...	12–15	121.0	4,273	101.3
High bunker (S) ...	12–15	121.0	4,273	101.3
Daily service tank I (S)	17–19	10.0	353	8.4
Daily service tank II (S)	17–19	10.0	353	8.4
		262.0	9,252	219.4

LUBRICATING OIL: Spec. weight=0,90; 39,9 cf/ts

D.B. drain tank (C) ...	21–32	20.2	713	17.9
Cylinder oil tank (P) ...	42–44	6.5	228	5.7
Cylinder oil tank (S) ...	42–44	6.5	228	5.7
Cylinder oil tank (S) ...	30½–33	15.0	530	13.3
Engine oil tank I (S) ...	25–27½	15.0	530	13.3
Engine oil tank II (S) ...	27½–30	15.0	530	13.3
H.D. oil tank (P) ...	18–20	2.0	71	1.8
Settling tank	17–19	20.0	706	17.7
Total of lubricating oil		100.2	3,536	88.7

FRESH WATER: Spec. weight=1,00; 35,9 cf/ts

D.B.-tank, cooling water (C)	33–39	22.7	800	22.3
D.B.-tank, feedwater (C)	12–20	31.9	1,127	31.4
D.B.-tank, feedwater (P)	25–39	41.8	1,476	41.1
D.B.-tank, feedwater (S)	25–39	41.6	1,469	40.9
Freshwater tank on peak deck (P)	4–11	95.9	3,386	94.3
Freshwater tank on peak deck (S)	4–11	95.9	3,386	94.3
Freshwater tank on main deck (P)	–3– 2	48.0	1,695	47.2
Freshwater tank on main deck (S)	–3– 2	48.0	1,695	47.2
Total of freshwater		425.8	15,034	418.7

DIMENSIONS OF HATCHES:

	Length m	ft	in	Breadth m	ft	in
No. 1–9 cargo hatch ...	8.8	28	10 7/16	10.0	32	9 11/16

TONNAGE:

	Gross cu m	Gross Reg. tons	Net cu m	Net Reg. tons
National	57,239.46	20,205.53	38,862.89	13,718.60
Suez	—	—	—	—
Panama	—	—	—	—

BALLAST WATER: Spec. weight=1,025; 35,0 cf/ts

Fore peak	220–stem	677.8	23,936	683.8
No. 1 deep tank (P) ...	196–220	277.6	9,803	280.1
No. 1 deep tank (S) ...	196–220	277.6	9,803	280.1
No. 2 D.B.-tank (P) ...	155–196	276.5	9,763	278.9
No. 2 D.B.-tank (S) ...	155–196	276.5	9,763	278.9
No. 2 bottom wing tank (P)	155–197	375.8	13,270	379.1
No. 2 bottom wing tank (S)	155–197	375.8	13,270	379.1
No. 3 D.B.-tank (P) ...	121–155	245.3	8,663	247.5
No. 3 D.B.-tank (S) ...	121–155	245.3	8,663	247.5
No. 3 bottom wing tank (P)	121–155	402.5	14,214	406.1
No. 3 bottom wing tank (S)	121–155	402.5	14,214	406.1
No. 4 D.B.-tank (P) ...	87–121	244.3	8,629	246.5
No. 4 D.B.-tank (S) ...	87–121	244.3	8,629	246.5
No. 4 bottom wing tank (P)	87–121	401.4	14,175	405.0
No. 4 bottom wing tank (S)	87–121	401.4	14,175	405.0
No. 5 bottom wing tank (P)	68– 87	195.0	6,886	196.7
No. 5 bottom wing tank (S)	68– 87	195.0	6,886	196.7
No. 6 bottom wing tank (P)	44– 68	214.8	7,586	216.7
No. 6 bottom wing tank (S)	43– 68	210.7	7,441	212.6
Tank on double bottom (P)	155–160	451.1	15,931	455.1
Tank on double bottom (S)	155–160	451.1	15,931	455.1
After peak	1– 12	297.7	10,513	300.3
Total		7,140.0	252,144	7,203.4
No. 1 top tank (P) ...	196–220	206.8	7,305	208.7
No. 1 top tank (S) ...	196–220	213.5	7,539	215.4
No. 2 top tank (P) ...	155–197	491.6	17,361	496.0
No. 2 top tank (S) ...	155–197	589.5	20,818	594.8
No. 3 top tank (P) ...	121–155	419.6	14,820	423.4
No. 3 top tank (S) ...	121–155	419.6	14,820	423.4
No. 4 top tank (P) ...	87–121	419.6	14,820	423.4
No. 4 top tank (S) ...	87–121	419.6	14,820	423.4
No. 5 top tank (P) ...	49– 87	469.0	16,563	473.2
No. 5 top tank (S) ...	49– 87	469.0	16,563	473.2
Ballast Water or Heavy Oil				
No. 5 D.B.-tank (P) ...	68– 87	140.7	4,969	141.9
No. 5 D.B.-tank (S) ...	68– 87	140.7	4,969	141.9
Total of ballast water		11,539.2	407,511	11,642.1

Notable Ships of the Year—14

The "Pearl Sea"

SWEDISH-BUILT REFRIGERATED CARGO VESSEL

A FAST refrigerated cargo vessel, one of three ordered by Trelleborgs Angfartygs AB, Trelleborg, Sweden, the *Pearl Sea*, 6,130 dwt, was built by Kockums Mekaniska Verkstads A/B, Malmo, Sweden, and is specially designed for the carriage of fruit. The ship is powered by a diesel engine and has a contract speed of 18.25 knots fully laden with fruit.

The principal particulars of the *Pearl Sea* are as follows:

Length o.a.	437ft 8¼in
Length b.p.	405ft 5 5/16in
Breadth	58ft
Depth to upper deck	36ft
Draught	25ft 0¾in
Deadweight	6,130 dwt
Gross tonnage	6,827 tons
Net tonnage	3,233 tons
Machinery output	6,960 bhp
Contract speed	18.25 knots
Fuel consumption (approx)	22.5 tons/day
Bunker capacity	1,328 tons
Ballast capacity	1,522 tons
Cargo capacity	258,000 cu ft

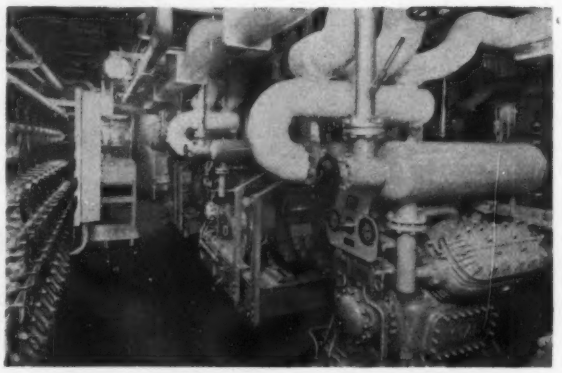
The *Pearl Sea* has been built with two continuous decks, two additional tweendecks forward and one aft, and four hatchways in the upper deck. She is of all-welded construction and has been ice-strengthened. The upper deck hatchways have steel covers of Kockums' design consisting of three sections with removable shifting beams between. The removal of one section only gives enough space for a banana transporter to be inserted. To facilitate loading there are also four cargo doors in each side at second deck level. The upper decks are covered with ¼-in Aranbeq Neodek deck composition, and shaded by permanent awnings of Corroplast sheeting.

Refrigerated Holds

The cargo space has been subdivided into 14 spaces forming eight insulated compartments which all can be cooled down to −4 deg F (−20 deg C) under tropical conditions. There are 28 air coolers with a total cooling surface of about 43,000 sq ft.

The cargo refrigerating plant has been supplied by STAL and is installed in the engineroom. It comprises four single-acting, nine-cylinder Freon-12 compressors having a total capacity of about 2,700,000 BTU/hr (680,000 k.cal./hr) at an evaporating temperature of +5 deg F (−15 deg C) and a condensing temperature of 86 deg F (+30 deg C). A temperature of −4 deg F can be maintained using three compressors only.

The 28 air coolers are installed two in each of the 14 cooling chambers which are situated underneath the mast houses. From the cooling chambers the air is discharged through ducts alongside the shell and into the cross bulkheads. The air is passed under the floor gratings from the side ducts and through holes in the upper part of the cross bulkheads opposite the cooling chambers. On rising through the cargo, the air is evacuated at the top and returns to the cooling chambers. The air can be circulated at any one of three speeds.

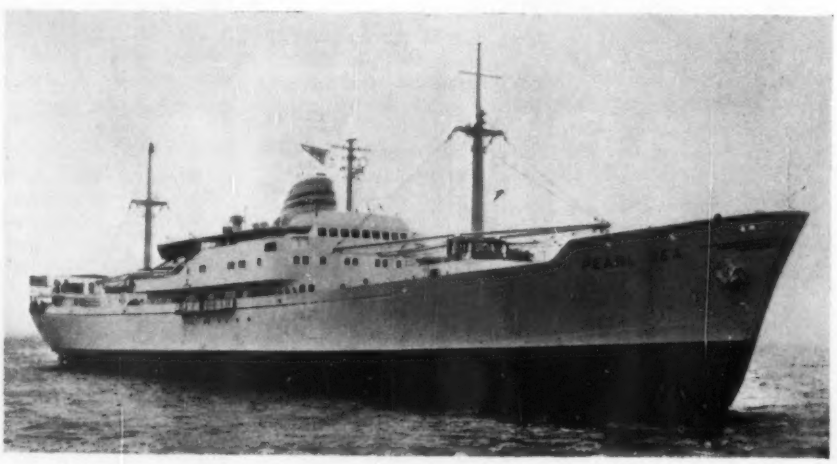


Main refrigerating compressors and distribution valves

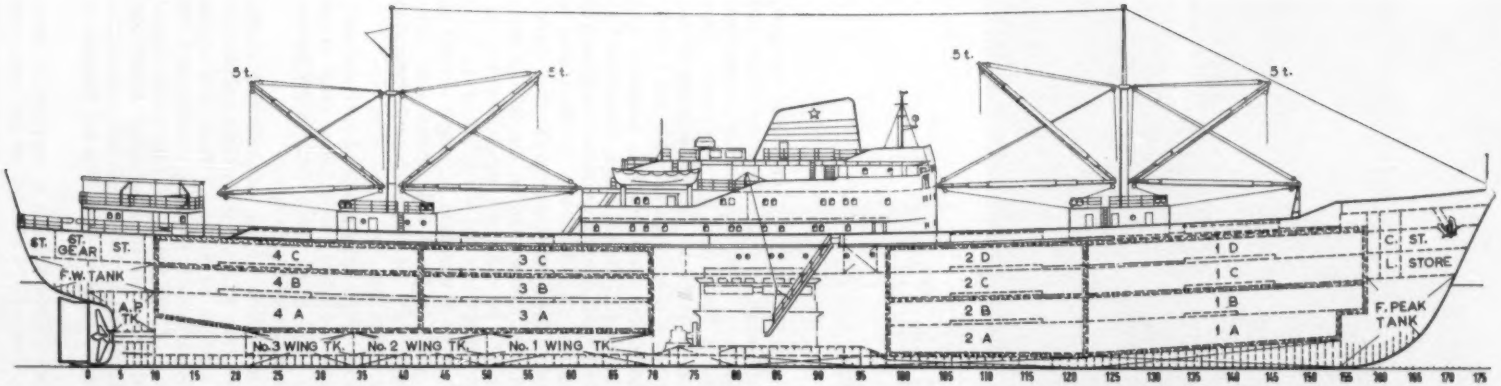
A special dilution air plant with E.C.D. ozone generators supplies the holds with fresh air when required. The cargo condition is controlled from the engine room by means of instruments for the determination of CO_2 and humidity. There are also distant reading thermometers, supplied by H. Mikkelsen & Co.

The dilution air plant comprises two double centrifugal fan units, one for the forward and one for the after spaces. Each of these fans can circulate the air of the holds up to 1.8 times per hour. The fan units are installed in the masthouses and force fresh air through a Miniduct pipe system to the intake for the main circulating cargo room fans. The corresponding quantity of used air is evacuated through pipes of similar type. The air quantity to be changed can be regulated by means of throttles. The ozone generators are placed in the masthouses, and a special valve system enables the whole ozone capacity to be used for the rapid deodorisation of one hold at a time.

Materials used for insulation requirements vary through-



The "Pearl Sea" on trials



Profile of the refrigerated cargo vessel "Pearl Sea," 6,130 dwt, built by Kockums Mekaniska Verkstads AB, Malmo, for Trelleborgs Angfartygs AB, Trelleborg, Sweden

out the holds. The tank tops, for example, are covered with high-density W.M.B. cork, surmounted with a reinforced Durastic asphalt floor. All bulkheads and sides and the under side of certain decks are lined with Billesholm glass fibre slabs covered with plywood. All holds can be subdivided by removable steel pillars and wooden battens to form banana bins.

Propelling Machinery

The propelling machinery in the *Pearl Sea* consists of an eight-cylinder turbocharged two-stroke Kockum-MAN engine type K8Z 70/120 C, of 6,960 bhp at 125 rpm. This engine is arranged for burning heavy fuel oil. The exhaust-gas turbochargers are of Brown Boveri type VTR 500. The engine is provided with a novel Kockum-designed lubricating oil-pressure control, that stops the engine automatically if the oil pressure should fail.

Three de Laval purifiers, one self-cleaning of type PX.309-4F, and two of type V1 B.1924 C, have been installed for handling fuel oil.

Electricity for power and lighting is supplied by four 375-kVA 440-volts AC ASEA alternators each driven by a six-cylinder, four-stroke turbocharged Kockum-MAN diesel engine type G6V 23.5/33. The sets are mounted on resilient suspension rubber blocks.

REFRIGERATING MACHINERY

Four refrigerating units from Stal, Finspang, Sweden.
Refrigerant: Freon 12 direct expansion.
Refrigerating capacity of each unit:
when cooling (sea) water +30 deg C, evaporator ±0 deg C : 320,000 kcal/h.
when cooling (sea) water +30 deg C, evaporator −15 deg C : 170,000 kcal/h.

Boilers:
one oilfired, heating surface 30 m², one exhaust gas water tube boiler, heating surface 105 m². Steam pressure 7 kg/cm².

Winches:
eight cargo winches for 5 tons lift, electric driven. One Capstan of 5 tons.

Derricks:
eight derricks dimensioned for 5 tons lift in single part.

Windlass:
electric driven for 2in chain cable.

Steering Gear:
electric-hydraulic, two motors of 22 bhp, rudder head 305 mm.

Heating Coils:
1 sq ft/25 cu ft in settl. tanks, oil fuel,
1 sq ft/40 cu ft in settl. tanks, diesel oil.

Speed:
18¼ knots on trial at 20ft 9in draft.

DRY CARGO SPACES, STORES, ETC.

Compartment			Frame	cu ft
Stores fwd	...	...	158–stem	8,120
Store aft	...	...	stern–E	1,080
Provision store	...	...	70–75½	3,180
Bonded store	...	...	72½–75½	260
Cold store	...	...	70–78	1,920

MASTS

				Height above top of bulwark
Fore mast	...	...	...	17.2 m = 56ft 5in
Radar mast	...	...	...	14.1 m = 46ft 4in
Main mast	...	...	...	17.2 m = 56ft 5in

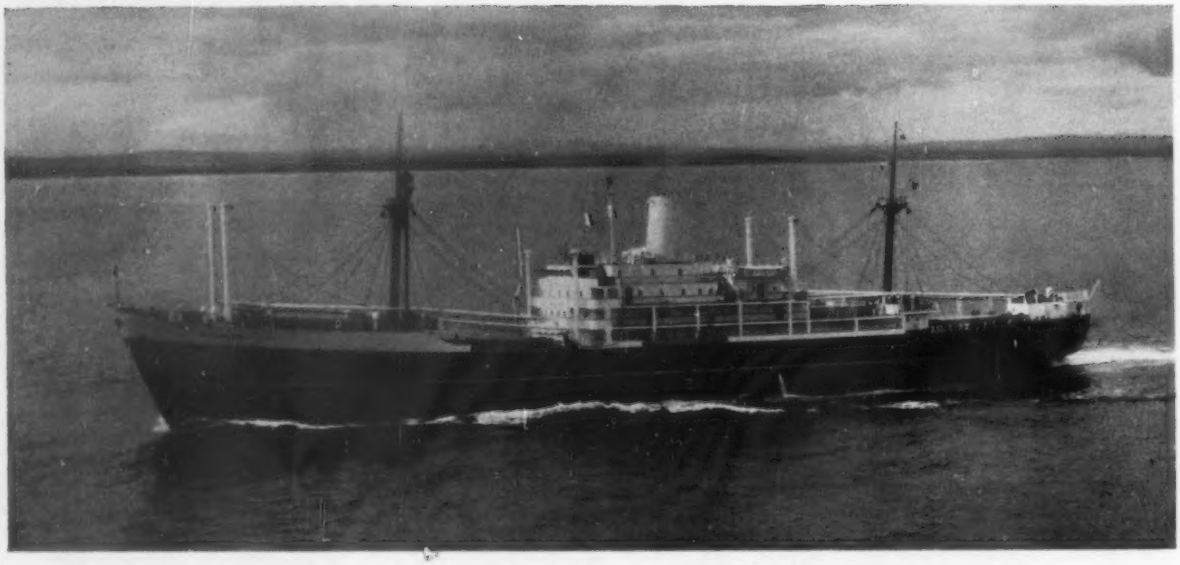
CARGO SPACES

Compartment			cu ft	M³
Holds: No 1a	...	...	9,910	280
No 1b	...	...	12,090	343
No 1c	...	...	15,930	451
No 1d	...	...	16,800	476
Hold No 1 total	...	...	**54,730**	**1,550**
Holds: No 2a	...	...	16,860	478
No 2b	...	...	17,550	497
No 2c	...	...	18,490	524
No 2d	...	...	18,120	512
Hold No 2 total	...	...	**71,020**	**2,011**
Holds: No 3a	...	...	22,500	638
No 3b	...	...	22,500	637
No 3c	...	...	21,910	620
Hold No 3 total	...	...	**66,910**	**1,895**
Holds: No 4a	...	...	15,680	444
No 4b	...	...	18,990	537
No 4c	...	...	21,520	610
Hold No 4 total	...	...	**56,190**	**1,591**
Grand total	...	...	**2,48,850**	**7,047**

CAPACITIES OF OIL, LUB. OIL, FRESH WATER & BALLAST TANKS

Frame	Tank		Cubic feet Total	M³	Tons at 1,016 kg 38 cu ft	40 ton	Oil—98% full Effect on draught due to filling tanks Mean draught 25ft 0in fwd ft in	25ft 0in aft ft in	20ft 0in fwd ft in	20ft 0in aft ft in	Tons at 1,016 kg 35 cu ft	36 ton	Water—98% full Effect on draught due to filling tanks Mean draught 25ft 0in fwd ft in	25ft 0in aft ft in	20ft 0in fwd ft in	20ft 0in aft ft in
154–stem	Fore peak tank	... ...	2,520	71	—	—	—	—	—	—	71	—	+0 9½	−0 5	+0 10½	−0 6½
123–154	No 1 d.b. tank	... ...	6,110	173	157	—	+1 4½	−0 7½	+1 6½	−0 9½	171	—	+1 6	−0 8	+1 8½	−0 10½
96–122	No 2 d.b. tank P & S	... ...	6,280	178	162	—	+0 10½	−0 2	+0 11½	−0 2½	176	—	+0 11½	−0 2	+1 ½	−0 3
78– 96	No 3 d.b. tank P & S	... ...	10,380	294	—	294	+0 9½	+0 3	+0 9½	+0 4	—	—	—	—	—	—
73– 80	No 4 d.b. tank P & S	... ...	3,100	88	—	—	—	—	—	—	—	84	−0 1½	+0 2	−0 1½	+0 2½
81– 95	Lub. oil tank in d.b. P & S	...	740	21	18	—	+0 ½	+0 0	+0 ½	+0 ½	—	—	—	—	—	—
50– 72	No 1 wing tank P	... ...	10,880	308	281	—	0 0	+1 ½	−0 2	+1 3½	305	—	0 0	+1 1½	−0 2	+1 5
50– 72	No 1 wing tank S	... ...	11,650	330	300	—	+0 ½	+1 ½	−0 1½	+1 4	326	—	−0 ½	+1 1½	−0 1½	+1 5½
34– 50	No 2 wing tank P	... ...	5,160	146	133	—	−0 3½	+0 8½	−0 4½	+0 11	144	—	−0 3½	+0 9½	−0 5½	+0 11½
34– 50	No 2 wing tank S	... ...	5,650	160	146	—	−0 3½	+0 9½	−0 5½	+1 0	158	—	−0 3½	+0 10½	−0 5½	+1 1
18– 34	No 3 wing tank P	... ...	2,120	60	55	—	−0 2½	+0 4½	−0 3½	+0 5½	59	—	−0 2½	+0 4½	−0 3½	+0 6
18– 34	No 3 wing tank S	... ...	2,540	72	66	—	−0 3	+0 5½	−0 4	+0 6½	72	—	−0 3½	+0 6	−0 4½	+0 7½
Stern– 10	F.W. tank after	... ...	4,770	135	—	—	—	—	—	—	—	129	−0 10	+1 2½	−1 ½	+1 6
Stern– 10	After peak tank	... ...	1,450	41	—	—	—	—	—	—	40	—	−0 3	+0 4½	−0 3½	+0 5½
93– 97	Settling tanks inner P & S	...	560	14	28	—	+0 ½	0 0	+0 ½	0 0	—	—	—	—	—	—
93– 97	Settling tanks outer P & S	...	260	32	—	12	+0 ½	0 0	+0 ½	0 0	—	—	—	—	—	—
	Total	... ...	**74,170**	**2,123**	**1,328**	**266**	—	—	—	—	**1,522**	**213**	—	—	—	—

Notable Ships of the Year—15



Cargo Liner "Turakina"

REFRIGERATED VESSEL FOR NEW ZEALAND-JAPAN SERVICE

THE FIRST fully refrigerated motor vessel to be built at the yard was delivered by Bartram & Sons Ltd, South Dock, Sunderland, to the New Zealand Shipping Co Ltd. This vessel, the *Turakina*, 8,200 dwt, was designed for the carriage of refrigerated cargo, chilled meat and general cargo, and is being employed initially in the service between New Zealand and Japan which is operated by the Crusader Shipping Co Ltd, London.

It is of interest that the *Turakina* is powered by the most powerful Clark-Sulzer engine yet built by George Clark (Sunderland) Ltd. During trials, which took place in September off the North East coast, a speed of 19 knots was attained with the ship in ballast condition. The new vessel is the fourth to bear the name *Turakina*, which is the name of a small New Zealand settlement on the river Turakina 24 miles south of Wanganui.

The *Turakina* is of the full scantling, flush deck type, with long forecastle erection, and has been constructed under the special survey of Lloyd's Register of Shipping and in compliance with the latest requirement of the Ministry of Transport and Factory Acts.

The principal particulars of the ship are:—

Length o.a.	455ft
Length b.p.	425ft
Breadth, moulded	62ft
Depth, moulded	38ft
Summer load draught ...	28ft 10in
Deadweight	8,200 tons
Gross tonnage	7,707 tons
Net tonnage	3,973 tons
Machinery output	9,750 bhp
Service speed	17 knots

Having the main propelling machinery amidships, the *Turakina* is subdivided by six main transverse watertight bulkheads, extending to the level of the upper deck, into two holds forward and two holds aft of the machinery space, with their associated tweendecks. Immediately forward of the machinery space, a cross-bunker extends to the second deck and is longitudinally subdivided into port, centre and starboard tanks, having settling tanks built into the centre compartment. The cross-bunker is separated from the after end of No 2 hold by a cofferdam. Two complete steel decks extend over the whole length of the vessel, while a third deck is arranged in Nos 1 and 2 holds.

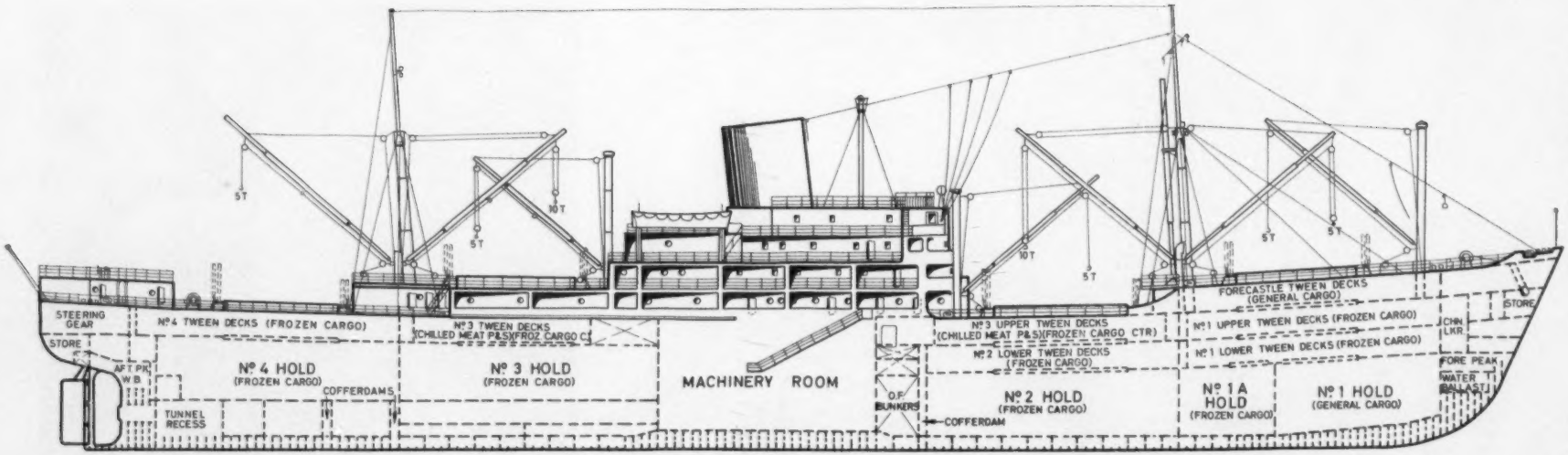
Each of the holds and tweendecks is insulated and arranged for the carriage of frozen cargo, except the forward portion of No 1 hold, where uninsulated cargo only is carried. Each weather deck hatchway is fitted with a MacGregor hydraulically-operated watertight steel cover.

The double bottom is constructed on the cellular principle, is longitudinally framed, and subdivided for the carriage of fuel oil, fresh water and water ballast. In No 3 hold the double bottom is increased in height abreast of the shaft tunnel, while in No 4 hold tunnel side tanks are arranged integral with the double bottom extending to the level of the tunnel top.

Chilled meat lockers have been provided port and starboard in No 2 upper tweendecks, with frozen cargo at the centre, and also in No 3 upper tweendecks, except for the hatch trunk, which is also a frozen space.

The *Turakina* is powered by a turbocharged Clark-Sulzer diesel engine, type RD76, having eight cylinders of 760mm bore and a piston stroke of 1,550mm. The engine for operation on heavy fuel oil, having a viscosity of 1,500 secs. Redwood No 1 at 100 deg. F; this particular engine is rated for a maximum continuous output of 10,400 bhp at 119 rpm; the basic engine design, however, provides a maximum continuous output of 1,500 bhp per cylinder at 119 rpm.

Electricity for power and lighting is supplied by three diesel-driven units, each of 350 kW DC at 220 volts, and one generator of 150 kW. The prime movers comprise three Ruston & Hornsby turbocharged diesel engines, each direct coupled to a Sunderland Forge marine type generator.



Profile of the cargo liner "Turakina", 8,200 dwt, built by Bartram & Sons Ltd, South Dock, Sunderland, for the New Zealand Shipping Co Ltd

GENERAL CARGO

Compartment	Frames	Grain cu ft	Grain Tons at 40 cu ft /ton	½ Beam cu ft	½ Beam Tons at 40 cu ft /ton
No 1 hold	144–166	19,276	481.9	17,421	435.5
Forecastle tween deck ...	132–166	25,023	625.6	23,611	590.3
No 2 upper deck hatch coaming	110–126	2,175	54.4	2,175	54.4
No 3 hatch trunk ...	46– 60	10,328	258.2	10,233	255.8
No 4 upper deck hatch coaming	18– 32	1,699	42.5	1,699	42.5
Totals		**58,501**	**1,462.6**	**55,139**	**1,378.5**

INSULATED CARGO

Compartment	Frames	Grain cu ft	Grain Tons at 40 cu ft /ton	½ Beam cu ft	½ Beam Tons at 40 cu ft /ton
No 1a hold	132–144	17,051	426.3	16,831	420.8
No 1 lower tween deck ...	132–166	15,569	389.2	15,555	388.9
No 1 upper tween deck ...	132–166	18,516	462.9	18,495	462.4
No 2 hold	102–132	63,397	1,584.9	63,035	1,575.9
No 2 lower tween deck ...	102–132	27,387	684.7	27,317	682.9
No 2 upper tween deck, (P)*	103–132	6,488	162.2	6,470	161.7
No 2 upper tween deck, (S)*	103–132	6,488	162.2	6,469	161.7
No 2 upper tween deck (C)	103–130	10,840	271.0	10,646	266.1
No 3 hold	39– 70	82,167	2,054.2	81,650	2,041.2
No 3 upper tween deck, (P)*	39– 73	9,097	227.4	9,020	225.5
No 3 upper tween deck, (S)*	39– 73	9,830	245.7	9,752	243.8
No 3 upper tween deck, (C)	41– 62	8,374	209.3	8,257	206.4
No 4 hold	10– 39	37,361	934.0	37,096	927.4
No 4 upper tween deck ...	7– 39	24,343	608.6	24,306	607.6
Totals		**336,908**	**8,422.6**	**334,899**	**8,372.3**

* Denotes that space is fitted for carriage of chilled meat.

GENERAL STOREROOMS

Compartment	Frames	Grain cu ft	Grain Tons at 40 cu ft /ton	½ Beam cu ft	½ Beam Tons at 40 cu ft /ton
Flask store 2nd dk., (P) ...	98–103	980	24.5	864	21.6
CO_2 room 2nd dk., (P) ...	98–103	969	24.2	897	22.4
Bulk store 2nd dk., (S) ...	98–103	2,143	53.6	2,012	50.3
Bonded store 2nd dk., (S)	98–103	826	20.6	782	19.5
Flour store 2nd dk., (P) ...	98–103	510	12.7	460	11.5
Calcium store 2nd dk., (P)	94– 96	367	9.2	313	7.8
Deck stores upper dk., (P & S)	132–135	1,258	31.4	1,048	26.2
Deck store upper dk., (S)	35– 38	526	13.1	440	11.0
Clean linen lkr. upper dk., (P)	61–6: A64	443	11.1	436	10.9
Dirty linen lkr. upper dk., (S)	61–6: A64	400	10.0	394	9.8
Drying room upper dk., (S)	65–18: F68	425	10.6	419	10.4
Drying room lower bridge dk., (S)	6: F69–9: A72	173	4.3	170	4.2
Drying room boat dk., (S)	91–94	457	11.4	452	11.3
Strong room boat dk., (P)	97–99	316	7.9	313	7.8
Linen store nav. bridge dk., (S)	12: F92–6: F95	277	6.9	274	6.8
Stews' working gear store 2nd dk., (P)	98–103	612	15.3	534	13.3
Totals		**10,682**	**266.8**	**9,808**	**244.8**

INSULATED STOREROOMS

Compartment	Frames	Grain cu ft	Grain Tons at 40 cu ft /ton	½ Beam cu ft	½ Beam Tons at 40 cu ft /ton
Handling room	77–80	230	5.7	230	5.7
Meat room	73–80	1,050	26.2	1,030	25.7
Beer room	80–84	630	15.7	610	15.2
Potato room	84–89	980	24.3	960	24.0
Vegetable room ...	89–95	910	22.7	910	22.7
Low temperature room ...	73–77	430	10.7	430	10.7
Totals		**4,230**	**105.5**	**4,170**	**104.0**

CHILLED MEAT

Compartment	Frames	½ Beam cu ft	½ Beam Tons at 40 cu ft/ton
No 2 upper tween deck, (P)	103–132	6,470	161.7
No 2 upper tween deck, (S)	103–132	6,469	161.7
No 3 upper tween deck, (P)	39– 73	9,020	225.5
No 3 upper tween deck, (S)	39– 73	9,752	243.8
Totals		**31,711**	**792.7**

WATER BALLAST AND BUNKERS

Tank	Frames	Oil fuel at .94 s.g. and 98% full	Water ballast at 35 cu ft /ton	Diesel oil at .88 s.g. and 98% full
No 1 d.b.t.	132–166	101	113	—
No 2 d.b.t., (P)	101–132	138	154	—
No 2 d.b.t., (S)	101–132	138	154	—
E.R. d.b.t. fwd, (P) ...	86–101	129	144	—
E.R. d.b.t. fwd, (S) ...	86–101	129	144	—
E.R. d.b.t. aft, (P)	70– 86	—	—	119
E.R. d.b.t. aft, (S)	70– 86	—	—	117
No 3 d.b.t. fwd, (P) ...	54– 70	159	177	—
No 3 d.b.t. fwd, (S) ...	54– 70	166	185	—
No 3 d.b.t. aft, (P) ...	39– 54	93	104	—
No 3 d.b.t. aft, (S) ...	39– 54	99	110	—
No 4 d.t. aft, (P)	18– 30	38	42	—
No 4 d.t. aft, (S)	18– 30	65	72	—
Fore peak	166–F.E.	—	61	—
Aft peak	0– 10	—	122	—
Cross bunker (P)	96–101	143	—	—
Cross bunker (C)	96–101	156	—	—
Cross bunker (S)	96–101	189	—	—
Totals		**1,743**	**1,582**	**236**

FRESH WATER

Tank	Frames	Fresh water at 36 cu ft /ton
No 4 d.t. fwd (P)	31–38	70
No 4 d.t. fwd (S)	31–38	79
Total		**149**

Notable Ships of the Year—16

The "Willowbank"

CARGO VESSEL FOR THE BANK LINE LIMITED

THE FIRST of a series of single-screw cargo vessels on order for the Bank Line Ltd, London, was completed last year. This vessel, the *Willowbank*, 12,030 dwt, was built by William Doxford & Sons (Shipbuilders) Ltd, Sunderland, who are also building two further vessels for the same owners. The Bank Line also has three vessels on order with Harland & Wolff Ltd, Belfast. The *Willowbank* is powered by a Doxford oil engine which gives her a service speed of 14.5 knots.

Principal Particulars

Length o.a.	487ft
Length b.p.	450ft
Breadth, moulded	62ft
Depth, moulded to upper deck ...	38ft 6in
Draught, summer	28ft 10⅝in
Deadweight, closed	12,030 tons
Gross tonnage	8,525 tons
Net tonnage	4,925 tons
Machinery output	4,800 bhp
Service speed	14½ knots

The *Willowbank* has been built to trade as an open or closed shelter deck vessel, and has a deadweight of about 10,143 tons open. The total cargo carrying capacity, including deep tanks, is 642,830 cu ft (grain), and 579,465 cu ft (bale). The deep tanks, which have been arranged forward and abaft the machinery space, hold 2,474 tons of vegetable oil. There are five cargo holds and cargo handling equipment consists of ten 5-tons, four 10-tons and one 25-tons derricks with Laurence Scott electric winches. As will be noted on the general arrangement drawing, there are two masts, a foremast and mainmast, and also derrick posts.

Accommodation

Accommodation has been arranged for the captain, deck officers, engineer officers and catering staff in the midship deck house. The native crew are housed in the tweendecks and after deck house. Thermotank heating and ventilation has been provided for the accommodation. The officers' dining saloon is at the forward end of the upper deck amidships.

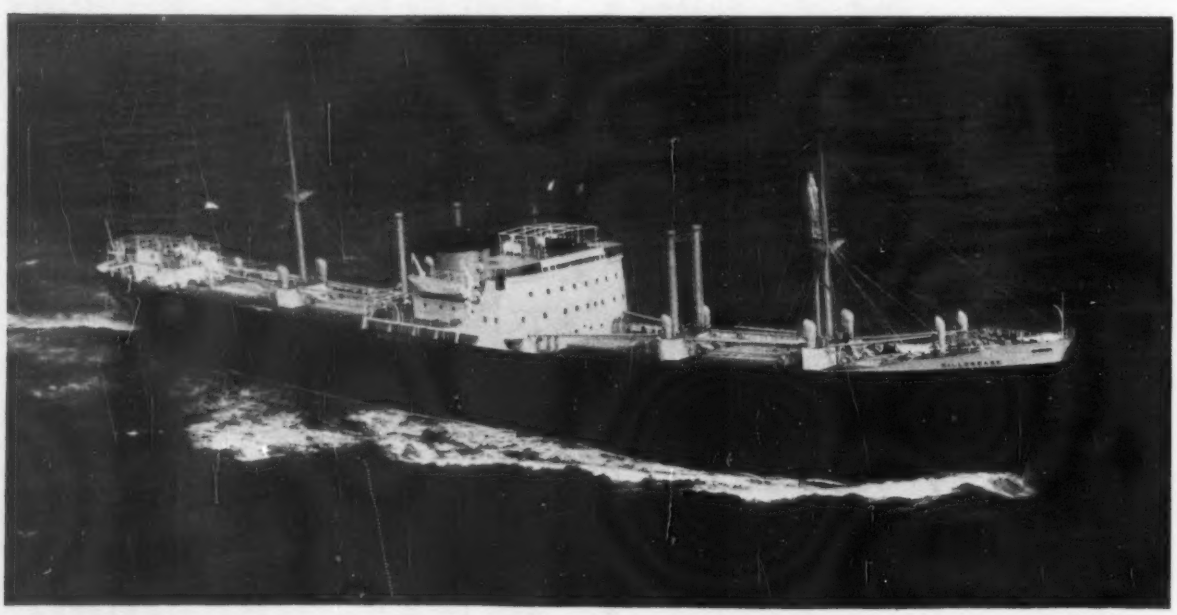
Propelling Machinery

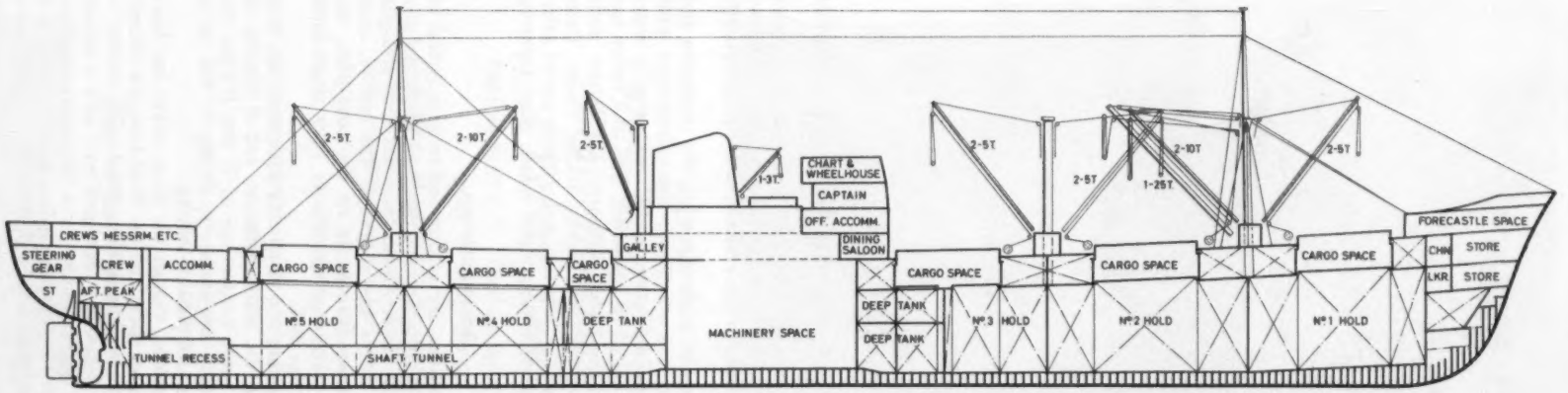
The propelling machinery consists of a four-cylinder normally-aspirated two-stroke Doxford oil engine, having cylinders of 700mm bore and a combined stroke of 2,320mm. The service rating of the engine is 4,800 bhp at 112 rpm. It is of the latest design incorporating crankcase diaphragms, oil-cooled lower pistons and timing valve injection. Two lever-driven scavenging air pumps are fitted. The propeller is of solid manganese bronze and manufactured by J. Stone & Co Ltd to their Heliston design.

Auxiliary Engines

Electricity for power and lighting is supplied by three diesel-driven electric generator sets, each set consisting of a Ruston & Hornsby five-cylinder four-stroke type VEBZ engine direct coupled to a Sunderland Forge 220-volts DC 200 kW generator running at 500 rpm. A Ruston & Hornsby four-cylinder emergency generator/air compressor set has also been installed. This set has a normal output of 20 kW when running at 1,000 rpm.

Two Fleming boilers have been installed for the supply of steam at 120 lb/sq in. In the main engine exhaust gas line a vertical multitubular boiler 6ft 6in dia by 15ft 9in high having a total heating surface of 700 sq ft has been fitted. This boiler is arranged to burn oil fuel under the Wallsend low air pressure system and alternatively to accept exhaust gases from the main engine. Below in the engine room there is another Fleming boiler with the same heating surface arranged to burn oil fuel only. Two feedwater pumps and a feed water heater have been supplied by G. & J. Weir Ltd.





Profile and arrangement of the cargo vessel "Willowbank", 12,030 dwt, built by William Doxford & Sons (Shipbyulders) Ltd, Sunderland, for the Bank Line Ltd, London

STORES

Compartment	Frames	Gross cu ft	Net cu ft
Tonnage hatch	21–23	2,640	2,370
Forecastle tween decks	177–stem	4,910	4,245
Upper tween decks forward	179–stem	2,580	1,930
Lower tween decks forward	179–stem	1,160	790
Lazarette	stern–T	1,480	940
Total stores		**12,770**	**10,275**

INSULATED STORES

Meat room		740	560
Vegetable room		315	250
Handing room		310	280
Total insulated stores		**1,365**	**1,090**

CARGO CAPACITIES

Compartment	Frames	Grain, cu ft	Bale, cu ft	L.C.G. from A.P.	V.C.G. above base
No 1 hold	150–175	54,900	46,900	392.73	21.65
No 2 hold	124–150	105,240	96,190	337.09	18.70
No 3 hold	111–124	53,370	50,300	289.62	17.53
Deep tank forward (lower)	100–111	26,330	20,960	259.77	12.16
Deep tank forward (upper)	100–111	17,700	14,820	259.53	24.86
Deep tank	63–76	49,690	43,220	169.42	17.69
No 4 hold	43–63	73,610	68,840	128.72	18.48
No 5 hold	10–43	78,280	68,830	69.89	21.28
Total holds		**459,120**	**410,060**	**233.68**	**19.07**
No 1 tween decks ...	150–175	24,370	21,995	394.71	41.00
No 2 tween decks ...	124–150	38,430	35,380	337.14	37.69
No 3 tween decks ...	100–124	36,990	34,530	275.67	35.73
Deep tank tween decks	63–76	19,860	18,370	169.36	35.19
No 4 tween decks ...	43–63	30,800	28,685	128.53	36.02
No 5 tween decks ...	23–43	29,020	26,515	78.60	37.28
Total tween decks ...		**179,470**	**165,475**	**236.12**	**37.11**
Special cargo locker ...	89–100	4,240	3,930	232.04	34.56
Grand total		**642,830**	**579,465**	**234.36**	**24.21**

TANK CAPACITIES (tons)

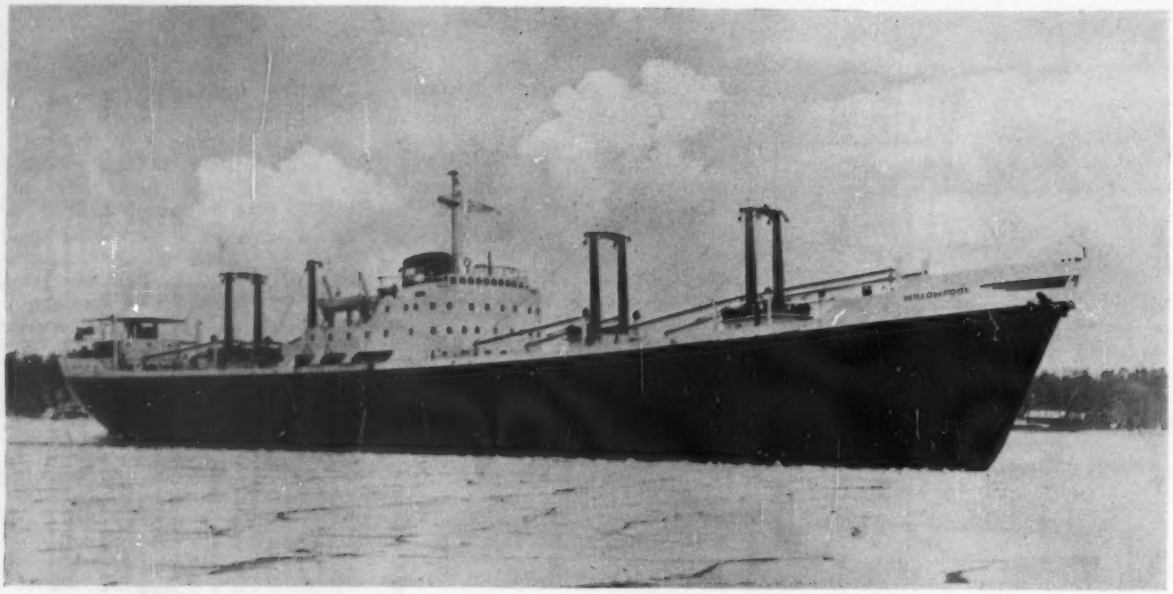
Compartment	Frames	Water ballast	Oil fuel	Fresh water	Veg. oil
No 1 double bottom tank ...	150–175	116	H 104	—	—
No 2 double bottom tank ...	124–150	275	H 246	—	—
No 3 double bottom tank ...	98–124	372	H 334	—	—
No 4 double bottom tank ...	81–98	—	D 218	—	—
No 5 double bottom tank ...	77–80	—	—	53	—
No 6 double bottom tank ...	63–76	167	H 149	—	—
No 7 double bottom tank ...	43–63	184	H 165	—	—
No 8 double bottom tank ...	21–43	109	H 98	—	—
Total double bottom tanks		**1,223**	**1,314**	**53**	—
Fore peak	175–stem	92	—	—	—
Deep tank forward (lower) ...	100–111	766	687	—	701
Deep tank forward (upper) ...	100–111	503	451	—	460
Deep tank	63–76	1,435	1,287	—	1,313
After peak	T–10	164	—	160	—
Grand total		**4,183**	**3,739**	**213**	**2,474**

D—Diesel oil H—Heavy oil

Water ballast taken at 35 cu ft/ton; Oil fuel taken at 39 cu ft/ton

Fresh water taken at 36 cu ft/ton; Veg. oil taken at 38.25 cu ft/ton

Notable Ships of the Year—17



The "Willowpool"

FIRST SHIP BUILT ABROAD FOR POOL SHIPPING COMPANY

THE FIRST SHIP to be built at a foreign yard for the Ropner group last year entered the service of the Pool Shipping Co Ltd. This vessel, the *Willowpool*, 12,950 dwt, was built by A/B Finnboda Varf, Stockholm, and is the largest ship this yard has so far delivered. Sir R. Ropner & Co. (Management) Ltd are now the sole agents in the U.K. and Eire for this yard. The ship has been completed as a closed shelterdecker and is at present under charter to R. Nerdrum Ltd for a series of voyages carrying British export cars to North American markets returning with grain or general cargo.

Principal Particulars

Length b.p.	441ft 9in
Length overall	486ft 7in
Breadth moulded	61ft 6in
Depth moulded to main deck ...	30ft 6in
Draught	29ft 11in
Deadweight (closed)	12,950 tons
Deadweight (open)	10,760 tons
Gross tonnage	8,972 tons
Machinery output	5,000 bhp
Service speed	14 knots
Cargo capacity:	
Grain	659,600 cu ft
Bale	530,900 cu ft

The vessel has been fitted with specially developed car-deck and grain loading arrangements. There are five holds, three forward and two aft of the engine room, and these have been fitted out with extra decks for the carriage of a total of over 700 cars. The car decks were designed by the builders in conjunction with Ropners' technical department, and consist of a bolted steel structure on which is laid a decking of open steel grille panels. These panels were supplied by Fisher & Ludlow Ltd, a member of the B.M.C., and were specially developed for this purpose. For the carriage of grain on the homeward voyage it is possible to leave the car decks in position. For other cargoes it will be necessary to dismantle the decks, but their bolted construction makes the operation relatively simple.

The five main hatches have ordinary wood covers with countersunk handles. The cargo handling gear comprises twelve 5-tons derricks, each served by a Thrige 3-tons spur geared winch.

In accordance with modern practice, the chartroom and wheelhouse have been combined: this undoubtedly leads to economy in building costs, in addition giving a better layout of the navigational equipment. The steel funnel has been faired into the bridge structure. The derrick posts are of self-staying goal-post type of Hallen design. These derrick posts have flat faces fore and aft, with curved sides, like the well-known Hallen bipod masts. Steel topmasts have been fitted.

Accommodation

The accommodation for officers and crew is typical of the high standard set in Scandinavian-built ships, and also in current Ropner ships. Ample space has been arranged throughout the cabins and alleyways. The captain, chief engineer and owner have suites on the boat deck; the remaining deck and engineer officers have single-berth cabins on the bridge deck.

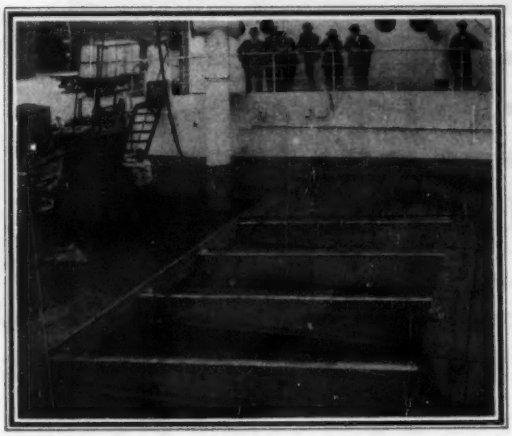
Mechanical heating and ventilating equipment has been fitted throughout the accommodation, and is capable of maintaining an inside temperature of 70 deg F when the outside atmospheric temperature is 23 deg F. The air is delivered by standard punkah louvres.

The hull is welded, though the sheer strake has been riveted to the upper deck, and the bilge keels are riveted. Corrugated bulkheads have been fitted. The rudder is of the Simplex balanced streamlined type with a turned stock connected to the rudder by a horizontal coupling. The deep tanks for dry cargo or ballast have been arranged aft of the engine room bulkhead. These tanks are divided by a centre line bulkhead, and extend from the bottom tank top to the second deck. Two fuel oil deep

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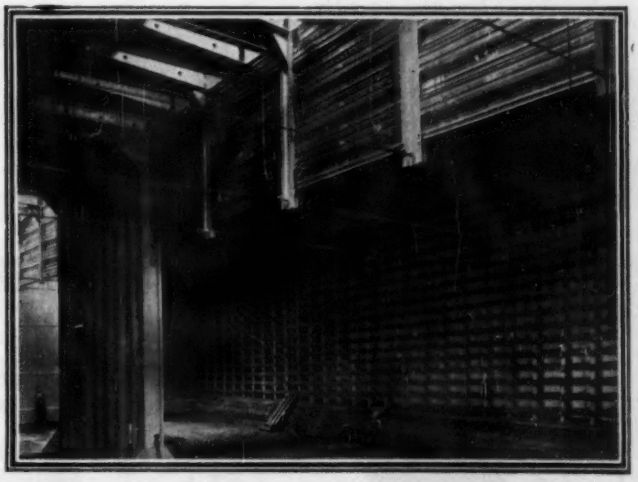
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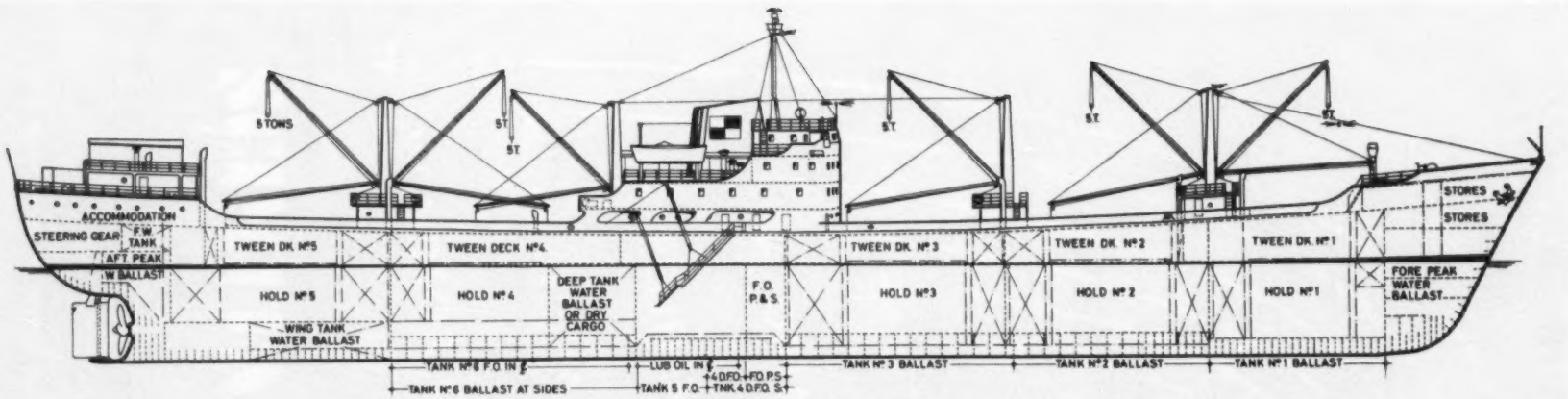
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Profile of the cargo vessel "Willowpool", 12,950 dwt, built by Finnboda Varf, Stockholm, for the Pool Shipping Co Ltd

tanks have been arranged forward of the engine room bulkhead. An unusual feature is the ballast tank which has been arranged in the tweendeck.

The propelling machinery of the *Willowpool* consists of a single-acting two-stroke six-cylinder, Gotaverken diesel engine, type 630/1,300 VGS 6U, built by Finnboda Varf under licence. The cylinders have a bore of 630mm and a piston stroke of 1,300mm, giving a fully-rated output of 5,000 bhp at 125 rpm. The unit is arranged for constant-pressure turbocharging, and has two double-acting scavenge pumps at the side of each cylinder, operating in series with a Napier 600Z exhaust gas turbocharger. Should the turbine be stopped, there is a by-pass by means of which the engine can be run as a normally aspirated unit. The semi-automatic electrically operated oil burning equipment was made by the Ray Oil Burner Company, of San Francisco.

Electricity for power and lighting is supplied by three 240-kW 220-volts DC compound-wound Thrige generators, each of which is driven at 500 rpm by a six-cylinder 360-bhp Ruston diesel engine, type 6VEBZ. For harbour use a 62½-bhp Ruston diesel engine driving a 40-kW generator at 1,000 rpm has been installed in the after masthouse.

CARGO CAPACITIES

Compartment	Located Frame No	Length ft	Length in	Grain cu ft	Bales cu ft	C.G. (grain) Vertic. ft	C.G. (grain) Horizont. ft
Hold No 1	143–168	56	0	52,300	42,700	19.7	154.4 F
Hold No 2	117–143	64	5	100,800	89,300	18.2	98.1 F
Hold No 3	89–117	69	6	112,200	101,400	17.9	31.5 F
Deep tank, PS	59– 70	27	4	20,300	—	18.0	64.3 A
Deep tank, SB	59– 70	27	4	21,100	—	17.7	64.3 A
Hold No 4	39– 59	49	9	73,200	66,200	17.7	102.0 A
Hold No 5	11– 39	69	9	52,200	44,500	21.8	158.1 A
Total under main deck				**432,100**	**344,100**	18.8	7.2 F
Tween deck No 1	148–168	45	0	37,600	33,400	39.2	158.1 F
Tween deck No 2	117–140	57	3	43,400	38,500	37.4	99.7 F
Tween deck No 3	89–117	64	6	44,400	39,300	36.4	32.8 F
Tween deck No 4	39– 70	77	0	52,300	46,100	36.8	90.2 A
Tween deck No 5	15– 39	59	9	43,500	38,500	37.6	157.4 A
Tonnage well	11– 15	9	11	6,300	5,700	37.4	192.0 A
Total tween deck				**227,500**	**201,500**	37.4	4.6 A
Grand total cargo space				**659,600**	**545,600**	25.1	3.2F

TANK CAPACITIES

Compartment	Located Frame No	Capacity 100% cu ft	Capacity (98% full) in tons: S. water 35.0 ft³/ts	Fuel oil 37.4 ft³/ts	Fuel oil 40.3 ft³/ts	Lubr. oil 39.9 ft³/ts	F. water 35.9 ft³/ts	C.G. Vertic. ft	C.G. Horizont. ft
Tank No 1, CL	143–168	7,222	202.2	—	—	—	—	3.35	151.90 F
Tank No 2, PS	118–143	6,692	187.4	—	—	—	—	2.59	98.36 F
Tank No 2, SB	118–143	6,692	187.4	—	—	—	—	2.59	98.36 F
Tank No 3, PS	88–118	9,086	254.4	—	—	—	—	2.56	32.51 F
Tank No 3, SB	88–118	9,086	254.4	—	—	—	—	2.56	32.51 F
Fuel oil tank, PS	84– 88	273	—	—	6.6	—	—	3.35	10.70 A
Feed water tank, CL	84– 87	236	—	—	—	—	6.4	2.05	11.94 A
Lubr. oil tank, PS	70– 83	508	—	—	—	12.5	—	2.04	34.06 A
Lubr. oil tank, SB	70– 83	512	—	—	—	12.6	—	2.04	34.06 A
Tank No 4, PS	79– 84	1,709	—	—	41.6	—	—	3.48	21.95 A
Tank No 4, SB	79– 88	2,016	—	—	49.0	—	—	3.44	20.14 A
Tank No 5, PS	70– 79	2,839	—	74.4	—	—	—	3.44	38.12 A
Tank No 5, SB	70– 79	2,839	—	74.4	—	—	—	3.44	38.12 A
Tank No 6, CL	39– 69	6,568	—	172.1	—	—	—	2.07	90.49 A
Tank No 6, PS	39– 71	4,785	133.9	—	—	—	—	3.17	81.89 A
Tank No 6, SB	39– 71	4,785	133.9	—	—	—	—	3.17	81.89 A
Wing tank, PS	21– 39	6,490	181.7	—	—	—	—	7.05	146.95 A
Wing tank, SB	21– 39	7,299	204.4	—	—	—	—	7.22	146.50 A
Total in double bottom			1,739.7	320.9	97.2	25.1	6.4		
Fore peak, CL	168–187	12,483	349.5	—	—	—	—	28.00	200.95 F
Tween deck tank, PS	140–148	5,473	153.3	—	—	—	—	37.30	133.75 F
Tween deck tank, SB	140–148	5,756	161.1	—	—	—	—	37.30	133.75 F
Deep tank, PS	84– 89	5,932	—	155.4	—	—	—	13.42	9.51 A
Deep tank, SB	84– 89	5,367	—	140.6	—	—	—	12.30	9.51 A
Settling tank, PS	84– 88	740	—	—	18.0	—	—	24.78	10.03 A
Day tank, PS	84– 88	560	—	—	13.6	—	—	24.78	10.03 A
Settling tank, SB	84– 88	740	—	19.4	—	—	—	24.78	10.03 A
Day tank, SB	84– 88	560	—	14.7	—	—	—	24.78	10.03 A
Day tank, SB	84– 88	560	—	14.7	—	—	—	24.78	10.03 A
Deep tank, PS	59– 70	20,246	566.8	—	—	—	—	18.02	64.32 A
Deep tank, SB	59– 70	21,005	588.1	—	—	—	—	17.71	64.32 A
After peak, CL	0– 11	9,506	266.1	—	—	—	—	28.21	207.90 A
Stern tank, CL	-11– 0	2,807	—	—	—	—	76.6	31.59	227.42 A
Tween deck tank, PS	3– 11	2,793	—	—	—	—	76.2	39.63	205.45 A
Tween deck tank, SB	3– 11	2,196	—	—	—	—	59.9	39.67	205.61 A
Tween deck tank, SB	5– 11	618	—	—	—	—	16.9	39.96	203.64 A
Total tank capacity			3,824.6	665.7	128.8	25.1	236.8		

Merchant Shipbuilding Returns for 1960

LAUNCHES FROM SHIPYARDS IN GREAT BRITAIN AND NORTHERN IRELAND

MACHINERY ABBREVIATIONS

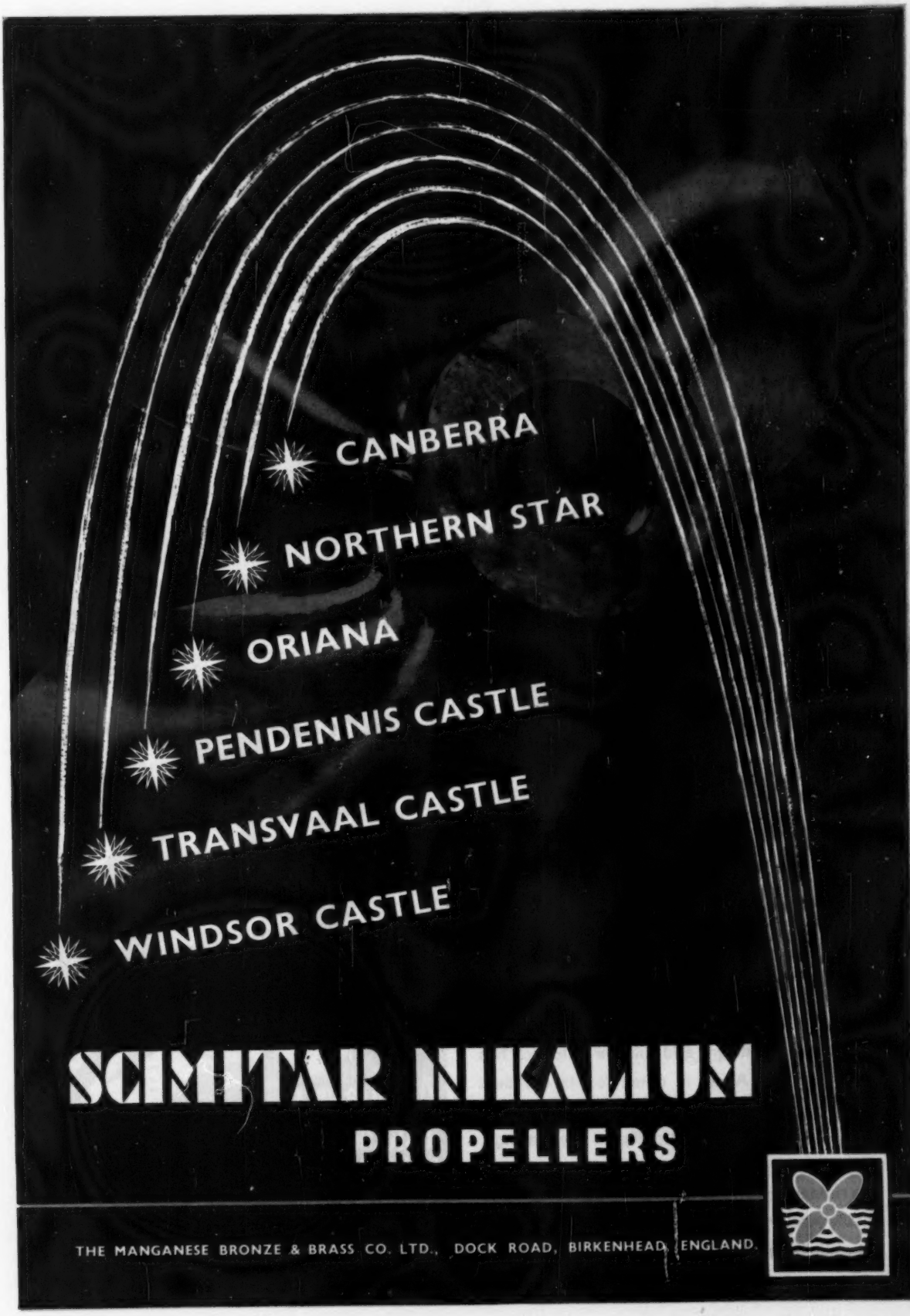
mv	... diesel	sst	... steam reciprocating		
st	... steam turbine		with exhaust turbine		
te	... turbo-electric	de	... diesel-electric		

THE CLYDE

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
AILSA SHIPBUILDING CO LTD, TROON				
Eastwood ...	... Cargo	... Constantine Shipping Co	... mv	1,793
St Clair ...	... Pass.	... North of Scotland, Orkney & Shetland Shipping Co	... mv	3,302
Kyleakin ...	... Ferry	... Caledonian S.P. Co ...	... mv	64
				5,159
ARDROSSAN DOCKYARD LTD, ARDROSSAN				
Elizabeth Paton ...	Trawler	... Ardrossan Trawling Co	... mv	220
Five self propelled barges		... Caribbean Equipment Co	... mv	1,040
				1,260
BARCLAY CURLE & CO LTD, WHITEINCH				
Athelqueen	... Tanker	... Athel Line	... mv	13,130
City of Sydney	... Cargo	... Ellerman Lines	... mv	10,600
Willesden	... Cargo	... Britain S.S. Co Ltd ...	... mv	8,300
				32,030
BLYTHSWOOD SHIPBUILDING CO LTD, SCOTSTOUN				
Texaco Oslo	... Tanker	... Texas Co (Norway) A/S, Oslo	mv	12,884
Hamilton Sleigh	... Tanker	... H. C. Sleigh, Melbourne ...	st	18,500
				31,384
GEO. BROWN & CO (MARINE) LTD, GREENOCK				
Brigadier ...	... Tug ...	... Steel & Bennie	... mv	200
				200
JOHN BROWN & CO (CLYDEBANK) LTD, CLYDEBANK				
Derby ...	... Tanker	... Charter Shipping Co ...	... st	31,791
Kent ...	... Tanker	... Federal S.N. Co ...	... st	31,763
				63,554
CHAS. CONNELL & CO LTD, SCOTSTOUN				
Crinan ...	... Ore carrier	Scottish Ore Carriers ...	... mv	7,086
Foyle ...	... Tanker	... Charter Shipping Co ...	... st	24,500
				31,586
WM. DENNY & BROTHERS LTD, DUMBARTON				
Cape Wrath	... Cargo	... Lyle Shipping Co ...	... st	10,905
City of St Albans	Cargo	... Ellerman Lines	... mv	7,155
City of Lichfield	... Cargo	... do	... mv	7,155
				25,215
FAIRFIELD SHIPBUILDING & ENG. CO LTD, GOVAN				
Yorkshire	... Cargo	... Bibby Bros	... mv	8,937
Shell Naiguata	... Tanker	... Cia. Shell de Venezuela	... st	21,859
Alert ...	... Cable ship	... H.M. Postmaster General	... de	6,200
Kanlica ...	... Ferry	... Denizcilik Bankasi T.A.O.	... sst	900
Kuzguncuk	... Ferry	... do	... sst	900
				38,796
FERGUSON BROTHERS (PORT GLASGOW) LTD, PORT GLASGOW				
Farahmand	... Tug ...	... BP Tanker Co	... mv	363
Scarlet Ibis	... Ferry	... Govt. of Trinidad ...	... mv	1,268
J. R. More	... Tug ...	... South African Railways	... sst	800
				2,431
FLEMING & FERGUSON LTD, PAISLEY				
Ajoy ...	... Dredger	... Calcutta Port Commissioners...	sst	1,066
				1,066
GREENOCK DOCKYARD CO LTD, GREENOCK				
Clan Macliwraith	Cargo	... Clan Line	... mv	7,354
				7,354
WM. HAMILTON & CO LTD, PORT GLASGOW				
Alaunia ...	... Cargo	... Cunard Line	... st	7,000
Trevalgan	... Cargo	... Hain S.S. Co	... mv	6,600
				13,600
HARLAND & WOLFF LTD, GOVAN				
Barpeta ...	... Cargo	... British India Line ...	... mv	6,736
Bamora ...	... Cargo	... do ...	... mv	6,736
Daghestan	... Ore carrier	Hindustan Steam Shipping Co	mv	11,204
Norsk Drott	... Tanker	... Norsk Braendselolje A/S, Oslo	mv	18,850
				43,526
A. & J. INGLIS LTD, GLASGOW				
Clyde ...	... Launch	... Clyde Navigation Trust	... mv	100
				100
JAMES LAMONT & CO LTD, GREENOCK				
Laksa ...	... Cargo	... Chr. Salvesen & Co ...	... mv	1,333
				1,333
LITHGOWS LTD, PORT GLASGOW				
Orlando ...	... Tanker	... Bowring S.S. Co Ltd ...	... mv	14,154
Border Shepherd	... Tanker	... Lowland Tanker Co Ltd	... mv	13,600
Donga ...	... Cargo	... British & Burmese S.N. Co	... mv	6,559
Dumbaia ...	... Cargo	... do	... mv	6,559
				40,872
SCOTT & SONS (BOWLING) LTD, BOWLING				
Storm ...	... Coaster	... Canterbury S.S. Co Ltd	... mv	931
Esso Jersey	... Tanker	... Esso Petroleum Co Ltd	... mv	350
				1,281
SCOTT'S SHIPBUILDING & ENG. CO LTD, GREENOCK				
Dunkwa ...	... Cargo	... Elder Dempster Lines ...	... mv	6,109
Iron Horse	... Ore carrier	Vallum Shipping Co ...	... mv	11,128
Iron Crown	... Ore carrier	do ...	... mv	11,128
				28,365
SIMONS-LOBNITZ LTD, RENFREW				
Samson ...	... Floating crane	Mersey Docks & Harbour Board	mv	1,100
Peraki ...	... Dredger	... Lyttelton Harbour Board	... sst	2,200
				3,300
ALEXANDER STEPHEN & SONS LTD, LINTHOUSE				
British Curlew	... Tanker	... BP Tanker Co	... mv	11,157
Mobil Apex	... Tanker	... Mobil Tankships ...	... st	12,754
Chuscal ...	... Refrig. cargo	Elders & Fyffes	... st	3,095
Iberic ...	... Refrig. cargo	Shaw Savill & Albion Co	... mv	11,160
				38,166
YARROW & CO LTD, SCOTSTOUN				
Nzam Creek	... Pusher tug	... Shell Tankers	... mv	200
				200

SCOTTISH OUTPORTS

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
BURNTISLAND SHIPBUILDING CO LTD, BURNTISLAND				
Lancastrian Prince	Cargo	... Prince Line	... mv	4,800
Westbury	... Cargo	... Alexander Shipping Co	... mv	8,533
Arthur Albright	... Bulk carrier	A. & W. (Overseas Developments)	... mv	6,640
				19,982
CALEDON SHIPBUILDING & ENG. CO LTD, DUNDEE				
Maron ...	... Cargo	... Alfred Holt & Co ...	... mv	8,531
City of Worcester	Cargo	... Ellerman Lines	... mv	7,149
				15,680
GRANGEMOUTH DOCKYARD CO LTD, GRANGEMOUTH				
Moana Roa	... Pass. cargo	... New Zealand Govt. ...	... mv	2,893
Santa Elena	... Refrig. cargo	Bovril	... mv	1,264
				4,157
ALEXANDER HALL & CO LTD, ABERDEEN				
NIL				
HALL, RUSSELL & CO LTD, ABERDEEN				
Colina ...	... Cargo	... Donaldson Line ...	... mv	1,776
Maureen Croan	... Trawler	... Joe Croan	... mv	234
Malcolm Croan	... Trawler	... do ...	... mv	234
Boston Wasp	... Trawler	... St Andrews Steam Fishing Co	mv	300
Aberdeen Venturer	Trawler	... Aberdeen Near Water Trawlers	mv	298
Granton Merlin	... Trawler	... William Carnie	... mv	235
Star of Scotland	... Trawler	... Walker Steam Trawl Fishing Co	mv	226
Star of the Isles	... Trawler	... do	mv	226
Glencairn	... Trawler	... Wood & Bruce	... mv	228
Admiral Drake	... Trawler	... Parbel-Smith	... mv	306
Admiral Jellicoe	... Trawler	... do	... mv	306
Admiral Hawke	... Trawler	... do	... mv	230
				4,893


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PROPELLERS
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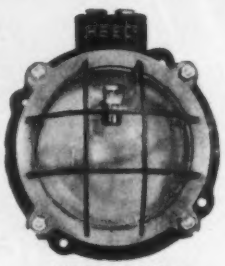
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Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
HERD & MACKENZIE LTD, BUCKIE AND PETERHEAD				
Braodhaven	Trawler	Faithlie Fishing Co	mv	163
5 motor fishing vessels			mv	228
1 motor yacht		J. H. Mackenzie	mv	35
				426
JOHN LEWIS & SONS LTD, ABERDEEN				
Clova	Trawler	Clova Fishing Co	mv	281
Captain Foley	Trawler	Iago Steam Trawler Co	mv	434
Ben Chourn	Trawler	R. Irvin & Sons	mv	278
Ben Tarbert	Trawler	do	mv	280
Grampian Hill	Trawler	Geo. Craig & Sons	mv	215
Grampian Glen	Trawler	do	mv	215
Gilmar	Trawler	Devanha Fishing Co	mv	215
Seaward Venture	Trawler	Seaward Fishing Co	mv	215
Hawkflight	Trawler	Hawkstone Fishing Co	mv	165
3 motor fishing vessels			mv	144
				2,442
LIVINGSTONE & CO, PETERHEAD				
Stratherrick	Trawler	Norman Lyle	mv	229
				229
A. J. MITCHELL & CO, PETERHEAD				
Forward Pride	Trawler	Forward Motor Trawlers	mv	212
Forward Grace	Trawler	do	mv	212
Summervale	Trawler	William Liston	mv	217
				631
HENRY ROBB LTD, LEITH				
Arcadian	Cargo	Ellerman's Wilson Line	mv	3,402
2 barges	—	Caribbean Equipment Co	mv	1,146
				4,548

NORTH-EAST COAST

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
AUSTIN & PICKERSGILL LTD, SUNDERLAND				
Iron Barque	Ore carrier	Vallum Shipping Co	mv	10,950
Glanely	Cargo	Atlantic Shipping & Trading Co	mv	8,261
Longstone	Ore carrier	Bamburgh Shipping Co	mv	13,062
Cheviot	Ore carrier	do	mv	13,062
Ravensworth	Ore carrier	R. S. Dalgliesh	mv	6,980
—	Mud barge	Cia Shell de Venezuela	NP	398
—	Mud barge	do	NP	398
				53,111
BARTRAM & SONS LTD, SUNDERLAND				
Turakina	Ref cargo	New Zealand S.S. Co	mv	7,707
Canterbury Star	Ref cargo	Blue Star Line	mv	7,550
Montrose	Cargo	Buries Markes	mv	6,900
Landwade	Cargo	Atlantic Shipping & Trading Co	mv	7,950
				30,107
BLYTH DRY DOCKS & SHIPBUILDING CO LTD, BLYTH				
Plumleaf	Tanker	Wm. Cory & Son	mv	12,692
Midhurst	Tanker	Stephenson Clarke	mv	1,328
Fernhurst	Tanker	do	mv	1,328
Knightsgarth	Ore carrier	St Denis Shipping Co	mv	10,862
Pass of Melfort	Tanker	Bulk Oil S.S. Co	mv	975
				27,085
CLELANDS (SUCCESSORS) LTD, WALLSEND				
Muthmirah	Coastal tanker	Abu Dhabi Marine Areas	mv	677
Humbergate	Coaster	Hull Gates Shipping Co	mv	199
Suvretta	Yacht	Suvretta Shipping Co	mv	180
Barca 152	Oil drilling platform	Cia Barca de Panama	NP	1,566
Kylebank	Cargo	Kyle Shipping Co	mv	1,250
Bombing target	—	Air Ministry	No	75
Barge	—	Abu Dhabi Marine Areas	NP	98
				4,045
WILLIAM DOXFORD & SONS (SHIPBUILDERS) LTD, SUNDERLAND				
Montcalm	Cargo	Montship Lines	mv	5,006
Willowbank	Cargo	Bank Line	mv	8,528
Stuart Prince	Tanker	Prince Line	mv	12,959
Custodian	Cargo	Charente S.S. Co	mv	8,850
Tudor Prince	Tanker	Prince Line	mv	12,959
				48,302
FURNESS SHIPBUILDING CO LTD, HAVERTON HILL-ON-TEES				
Llangorse	Tanker	Radcliffe Tankers	st	21,846
Gulf Briton	Tanker	Britama Tankers	st	26,500
Gulf Scot	Tanker	do	st	26,500
				74,846
WILLIAM GRAY & CO LTD, WEST HARTLEPOOL				
Mabel Warwick	Ore Carrier	Ore Carriers	mv	11,632
Joya McCance	Ore carrier	Ore Carriers	mv	11,871
2 oil and cargo barges	—	Holt's Transport	mv	582
				24,085

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
HAWTHORN LESLIE (SHIPBUILDERS) LTD, HEBBURN				
Kirriemoor	Cargo	Moor Line	mv	5,923
Kayeson	Tanker	"K" Steamship Co	st	28,600
Hardwicke Grange	Ref cargo	Houlder Bros & Co	st	10,300
Clymene	Tanker	Hadley Shipping Co	st	12,300
				57,123
SIR JAMES LAING & SONS LTD, SUNDERLAND				
Aldersgate	Ore carrier	Bishopsgate Shipping Co	mv	12,718
Montana	Tanker	A/S Tanktransport	mv	13,045
				25,763
T. MITCHISON LTD, GATESHEAD				
Starwood	Trawler	Leslie Fishing Co	mv	250
Leswood	Trawler	Ashley Fishing Co	mv	250
Dalewood	Trawler	do	mv	250
Jasmin	Trawler	do	mv	250
Japonica	Trawler	do	mv	250
Jacamar	Trawler	do	mv	250
Coastal Emperor	Trawler	Johnstone Motor Trawlers	mv	250
Coastal Empress	Trawler	do	mv	250
Janwood	Trawler	Burwood Fishing Co	mv	250
Milwood	Trawler	do	mv	250
Island Mariner	Tug	Island Tug & Barge	mv	150
				2,650
JOHN READHEAD & SONS LTD, SOUTH SHIELDS				
Trewidden	Cargo	Hain S.S. Co	mv	6,671
Kohistan	Cargo	Strick Line	mv	9,665
Photinia	Bulk carrier	Stag Line	mv	7,666
				24,002
SHORT BROTHERS LTD, SUNDERLAND				
Brighton	Cargo	Chapman & Willan	mv	6,073
				6,073
SMITH'S DOCK CO LTD, MIDDLESBROUGH				
Rembrandt	Cargo	Bolton S.S. Co	FP	8,104
Mantua	Tanker	Charter Shipping Co	st	12,899
Stonegate	Tanker	Turnbull Scott Shipping Co	mv	12,300
Athelviscount	Tanker	Athel Line	mv	12,900
				46,203
SWAN, HUNTER & WIGHAM RICHARDSON LTD, WALLSEND AND WALKER-ON-TYNE				
Port New Plymouth	Ref cargo	Port Line	mv	13,085
Border Pele	Tanker	Lowland Tanker Co	mv	13,490
Clan Fergusson	Cargo	Clan Line of Steamers	mv	9,000
Lobito Palm	Cargo	Palm Line	mv	6,157
Border Castle	Tanker	Lowland Tanker Co	mv	13,490
Ikeja Palm	Cargo	Palm Line	mv	5,658
Principe Perfeito	Pass	Cia Nacional de Navegacao	st	19,000
				79,880
JOSEPH L. THOMPSON & SONS LTD, SUNDERLAND				
Lindisfarne	Ore carrier	Bamburgh Shipping Co	mv	12,733
Flying Witch	Tug	Clyde Shipping Co	mv	116
Flying Wizard	Tug	do	mv	116
Esso Ipswich	Coastal tanker	Esso Petroleum Co	mv	1,103
Busiris	Tanker	Moss Hutchison Line	st	24,300
Thistleroy	Cargo	Albyn Line	mv	7,919
				46,287
VICKERS-ARMSTRONGS (SHIPBUILDERS) LTD, WALKER				
Serenia	Tanker	Shell Tankers	st	41,800
Empress of Canada	Pass	Canadian Pacific Steamships	st	28,000
				69,800

REST OF ENGLAND

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
ALDOUS SUCCESSORS LTD, BRIGHTLINGSEA				
2 touring launches; 8 small tugs; 1 steel tug; 1 launch				171
				171
ATLANTIC SHIPBUILDING CO LTD, NEWPORT				
Habana	Cargo	Oficina de Fomento Maritimo Cubano	mv	2,945
				2,945
J. BOLSON & SON LTD, POOLE				
Esso Dover	Tanker	Esso Petroleum Co	mv	500
				500
BRAZEN ISLAND SHIPYARD LTD, POLRUAN				
Vendome	Cargo	Lockett Wilson Line	mv	400
				400
BROOKE MARINE LTD, LOWESTOFT				
Loch Eriboll	Trawler	Loch Fishing Co	mv	700
2 passenger launches	—	Bermuda Board of Trade	mv	100
				800

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
CAMMELL LAIRD & CO (SHIPBUILDERS & ENGINEERS) LTD, BIRKENHEAD				
Bidford Priory	Tanker	Warwick Tanker Co	st	23,065
Retriever	Cable ship	Cable & Wireless	de	4,000
Weather Cock	Tug	North West Tugs	mv	159
1 dumb barge	—	Mersey Docks & Harbour Board		101
				27,325
COCHRANE & SONS LTD, SELBY				
Lavinda	Trawler	J. Marr & Son	mv	285
Ross Puma	Trawler	Ross Group	mv	352
Ross Genet	Trawler	do	mv	352
Ross Civet	Trawler	do	mv	352
Ross Zebra	Trawler	do	mv	352
Cliona	Research trawler	Ministry of Agriculture, Fisheries & Food	mv	470
Ross Eagle	Trawler	Ross Group	mv	245
Ross Hawk	Trawler	do	mv	245
Ross Kestrel	Trawler	do	mv	245
				2,898
JAMES W. COOK & CO (WIVENHOE) LTD, WIVENHOE				
Dunlin C	Tank barge	James W. Cook & Co	mv	146
Blackcat C	Tank barge	do	mv	141
Daisy	Barge	Dover Harbour Board	—	360
				647
COOK, WELTON & GEMMELL LTD, BEVERLEY				
Arctic Cavalier	Trawler	Boyd Line	mv	764
Arctic Corsair	Trawler	do	mv	764
Royalist	Trawler	Hewett Fishing Co	mv	228
Stella Leonis	Trawler	Ross Trawlers	mv	775
Vivaria	Trawler	Atlas Steam Fishing Co	mv	744
Starella	Trawler	J. Marr & Son	mv	606
Kingston Amber	Trawler	Kingston Steam Trawling Co	mv	830
Somerset Maugham	Trawler	Newington Steam Trawling Co	mv	800
Linaria	Trawler	Irvin & Johnson	mv	360
Robert Hewett	Trawler	Heward Trawlers	mv	600
Trueman	Trawler	Crampin Steam Fishing Co	mv	425
				6,896
J. S. DOIG (GRIMSBY) LTD, GRIMSBY				
Atlantic Seal	Trawler	Storgram Trawlers Ltd	de	250
Saxon Progress	Trawler	Alfred Bannister (Trawlers)	mv	215
				465
RICHARD DUNSTON LTD, THORNE AND HESSLE				
Sea Alert	Tug	C. J. King & Son	mv	175
Dalegarth	Tug	R. & J. H. Rea	mv	306
Granton Osprey	Trawler	G. Craig & Sons	mv	230
Breckland	Dredger	British Transport Commission	mv	417
Ionia	Tug	Wm. Watkins	mv	186
Fossa	Tug	Gaselee & Son	mv	100
—	Trawler	—	mv	151
Selby Sara	Lighter	British Oil & Cake Mills	mv	147
Selby Michael	Lighter	do	mv	147
Grayfish	Trawler	Huxley Fishing Co	mv	151
Silverfish	Trawler	do	mv	151
Newclose	Lighter	Vectis Shipping Co	mv	118
Three tugs; two swim barges; three lighters; three hopper boats				578
				2,857
DRYPOOL ENG. & DRY DOCK CO LTD, HULL				
Paull Holme	Barge	British Transport Commission	mv	850
				850
GOOLE SHIPBUILDING & REPAIRING CO LTD, GOOLE				
Notts County	Trawler	Consolidated Fisheries	mv	441
Notts Forest	Trawler	do	mv	441
Barnsley	Trawler	do	mv	441
Annuity	Tanker	F. T. Everard & Sons	mv	1,597
D. B. Finn	Trawler	St Andrews Steam Fishing Co	mv	700
				3,620
JOHN HARKER LTD, KNOTTINGLEY				
Weasedale H	Tank barge	John Harker	mv	270
Burtondale H	Tank barge	do	mv	172
Kendale H	Tank barge	do	mv	256
Cotterdale H	Tank barge	do	mv	172
Derriedale H	Tank barge	do	mv	172
				1,042
P. K. HARRIS & SONS LTD, APPLEDORE				
Burgemeester Vandamme	Tug	Union de Remorquage et de Sauvetage	mv	150
Meeching	Tug	British Transport Commission	mv	152
Red Nab	Barge	do	mv	600
Kingston Buci	Tug	Shoreham Harbour Trustees	mv	76
Star of Devon	Trawler	Walker Steam Trawling Co	mv	250
Foundation Vibert	Tug	Foundation Maritime	mv	200
				1,428
CHARLES HILL & SONS LTD, BRISTOL				
Cambrian	Tug	Alexandra Towing Co	mv	163
Rhymney	Dredger	British Transport Commission	mv	710
Ely	Dredger	do	mv	834
Norstar	Dredger	Norwest Sand & Ballast Co	mv	586
				2,293

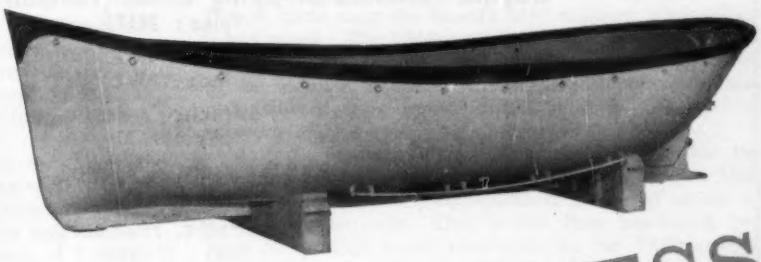
Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
JAMES & STONE (BRIGHTLINGSEA) LTD, BRIGHTLINGSEA				
Boston Hornet	Trawler	Boston Deep Sea Fisheries	mv	311
Boston Comet	Trawler	do	mv	137
Two pusher tugs; one patrol launch			mv	158
				426
PHILIP & SON LTD, DARTMOUTH				
Skua	Lightship	Irish Lights	—	350
Planet	Lightship	Mersey Docks & Harbour Board	—	452
—	Ferry	Philip & Son	de	100
Two pilot launches for Trinity House			mv	112
				1,014
JAMES POLLOCK & CO LTD, FAVERSHAM				
Lord Waverley	Tug	Port of London Authy.	mv	109
Dale Park	Lighter	London owners	—	250
Alice	Lighter	do	—	100
Iron Shaft	Lighter	General Steam Nav. Co	—	160
Iron Flint	Lighter	do	—	160
Odiham	Lighter	Wrightson & Co	—	160
Oporto	Lighter	do	—	160
One tug; two ferry pontoons			—	78
				1,177
RICHARDS IRONWORKS LTD, LOWESTOFT				
Boston Argosy	Trawler	Boston Deep Sea Fisheries	mv	195
Wilton Queen	Trawler	Taliaman Trawlers	mv	199
Suffolk Warrior	Trawler	Small & Co (Lowestoft)	mv	146
Suffolk Kinsman	Trawler	do	mv	202
Suffolk Mariner	Trawler	do	mv	202
Roy Stevens	Trawler	Explorator	mv	202
Margaret Christina	Trawler	East Anglian Ice & Cold Storage Co	mv	137
				1,283
JOHN I. THORNYCROFT & CO LTD, WOOLSTON				
Keverne	Tug	J. P. Knight	mv	247
Gatcombe	Tug tender	Southampton I. o W., & S. of England R.M.S.P. Co	mv	477
—	Ferry	Cornwall County Council	de	439
—	Ferry	do	de	439
One diving boat		Shell Tankers	mv	32
				1,634
VICKERS-ARMSTRONGS (SHIPBUILDERS) LTD, BARROW NIL				
VOSPER LTD, PORTSMOUTH				
Haselbech	Trawler	Fleetwood Near Water Trawlers	mv	425
Parkroyd	Trawler	do	mv	425
				850
J. SAMUEL WHITE & CO LTD, COWES				
Caesarea	Pass	British Transport Commission	st	4,174
Sarnia	Pass	do	st	4,174
				8,348
WHITE'S SHIPYARD, SOUTHAMPTON				
Catherine	Ferry	British Transport Commission	mv	213
Edith	Ferry	do	mv	213
				426
W. J. YARWOOD & SONS LTD, NORTHWICH				
Avongarth	Tug	R. & J. H. Rea	mv	155
Elmgarth	Tug	do	mv	62
Pelican	Tug	British West Indies service	mv	203
				420

NORTHERN IRELAND

Name of Ship	Type	Owners	Type of Engines	Gross Tonnage
HARLAND & WOLFF LTD, BELFAST				
William Wheelwright	Tanker	Pacific S.N. Co	st	31,320
Tresfonn	Bulk carrier	Sigval Bergesen	mv	13,471
Canberra	Pass	P & O Line	te	45,000
Arlanza	Pass	Royal Mail Lines	mv	20,362
Iceni	Cargo	Shaw Savill Line	mv	11,239
Edward Stevinson	Tanker	Stevinson Hardy & Co	st	31,320
Port Alfred	Refrig. cargo	Port Line	mv	10,670
Avonbank	Cargo	Bank Line	mv	8,694
Krossfonn	Bulk carrier	Sigval Bergesen	mv	13,471
				185,547

SUMMARY

	1958	1959	1960
The Clyde	413,807	386,423	410,787
Scottish Outports	92,136	84,600	52,988
N-E Coast	692,682	621,824	619,362
Rest of England	115,641	169,008	70,765
Northern Ireland	100,352	120,597	185,547
	1,414,518	1,382,452	1,339,449



Lifeboats made from polyester/glass fibre have attracted world-wide interest and are coming into service on an increasing scale. This lifeboat is 26-ft long and is made by Hugh McLean & Sons Ltd., of Renfrew.

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This 3-ft. Winker Buoy (Patent applied for) is moulded in Polyester reinforced glass fibre by CHANCE LONDEX Ltd. The unusual underwater shape, easily moulded, forces the buoy to remain upright in a tideway.

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NEWS FROM OVERSEAS

From The Shipping World's Own Correspondents

Norwegian Shipbuilding in 1960

IN THE annual report for 1960 of the Association of Norwegian Shipbuilders it is estimated that deliveries from Norwegian yards for the year will total 235,000 grt, or practically the same as in 1959. On July 1 last there were on order or being built 139 vessels totalling 1,107,200 grt at Norwegian yards, compared to 138 vessels on order six months earlier. Of the 139 vessels on order, 41 totalling 747,200 grt were tankers. No fewer than 54 of the 139 were vessels of between 100 and 500 tons gross, while 29 were between 10,000 and 15,000 tons, nine between 15,000 and 25,000 tons and four of 30,000 grt or more.

Among the new orders placed in 1960 there are 20 orders for seagoing fishing vessels, seven for small coastal cargo vessels, 10 for car and passenger ferries of various sizes, two for small motor tankers, four for bulk carriers of 15,000 to 18,000 dwt, five for cargo liners of 2,500 to 8,000 dwt, one for an icebreaker and two for hydrofoil boats. Some of the seagoing fishing vessels have been ordered by owners in Sweden, Iceland or in the Faroe Islands.

During the year there has been little difficulty in obtaining the necessary parts and components for building hulls, engines or for fitting out vessels. There is, however, still a lack of skilled labour and as a consequence efforts to rationalise production and to make machines take the place of labour have continued. In fact the number of workers in the shipyards is the same as it has been for the past 10 to 12 years, about 14,000, and it is noteworthy that in 1960 there was no lay-off of workers, not even temporarily. Work has thus continued smoothly all through the year without any disturbances or strikes, a fact which is much appreciated by the management of the yards. Taken as a whole, 1960 was a good year for the yards and practically all enter 1961 with their order books well filled so that they can plan effectively for the future.

Little Profit on Hawaii Service

THE Matson Navigation Company, in a brief filed with the Federal Maritime Board, has stated that its Hawaii freight earnings, under rates as increased in September 1959, have been only one-fourth the level the FMB has determined to be reasonable for the service. The brief, which followed FMB hearings on a 12½ per cent Hawaii freight rate increase, emphasised that Matson had not earned and cannot expect to earn a return even under the increased rates which would equal the "just and reasonable level" determined by the Board in 1957. Matson said it had put some $15,000,000 of new capital into the Hawaii trade since the Board's 1957 decision, upon which it had relied. The FMB permitted the increase to go into effect in September 1959, but stipulated that any portion of the increase determined to be unreasonable in subsequent investigation by the Board must be refunded to shippers.

Matson's earnings under the increased rates for the 11-month period from 1 October 1959 to 31 August 1960 amounted to $612,000, equivalent to a rate of return of about two per cent. This is less than one-fourth the level of earnings found reasonable by the FMB after a 1957 hearing, in which it ruled that Matson was entitled to rates that would provide a return of 7.8 to 9.3 per cent on the fair value of the company's property used in cargo operations. Matson stated that payments it makes to four major shareholders for their agency, stevedoring and terminal services to Matson in Hawaii are "reasonable and allowable in full for rate-making purposes." These four firms each own from 2.6 to 33.5 per cent of Matson's common stock.

New Liberian Shipping Firm

IN MONROVIA, Liberia, a joint Liberian-Dutch-Israeli shipping company has now been established following the conclusion of an agreement between the Government of Liberia, the Verolme United Shipyards of Rotterdam, and the Israeli steamship agents and brokers Aaron Rosenfeld, of Haifa. The Liberian Government will own half the shares, the Israel and Dutch partners 25 per cent each. The Israeli firm will manage the new joint enterprise. It is learned that the initial capital would amount to $10 mn. Verolme United Shipyards will start immediately with the construction of two 35,000-tons vessels which will ply two regular routes between Liberia, the United States and Europe, carrying Liberian ores. Until the vessels are ready for service, the new firm may use chartered ships.

SECOND OF CLASS FOR SWEDISH OWNERS

The bulk carrier "Bonita", 15,300 dwt, has been delivered to Rederi A/B Dalen, Gothenburg, from the Malmo shipyard of Kockums Mekaniska Verkstads A/B. The "Bonita" is a sister ship of the "Aleppo" (SW, 20.4.60). Of all-welded construction, the hull is longitudinally framed in double bottom, deck wing-tanks and in the engine room above the second deck. Otherwise the framing is transverse. Cargo is carried in five pillarless cargo holds, which are made self-trimming by means of ballast wing tanks below the deck and hoppered wing tanks extending the whole length of the cargo zone. Grain cargo can be carried without using shifting boards



SURVEY OF BRITISH SHIPPING

(*Continued from page 66*)

venience. Reference has already been made to the prodigious postwar growth of the fleets under these flags and to the fact that this freedom from taxation was guaranteed for a long period of years. Under present conditions, the tax-free advantages of flags of convenience have temporarily lost much of their significance; over 1½ mn of such tonnage is laid up. However, the fact that this tonnage—much of it consisting of modern tankers—is waiting to resume trading is not only contributing to the continued depression of the freight market but, in the long term, is the cause of deep concern to British tramp owners, dry cargo and tanker, looking beyond the depression. With an improvement in the market, the greater will be the advantages to owners of flag-of-convenience tonnage by reason of the favourable conditions under which they trade.

Many suggestions have been proffered internationally for dealing with the elusive problem of flags of convenience, but none of them appears to provide a practical solution. One reason is that much of this tonnage—probably about 40 per cent—is owned by American interests whose Government encourages American-owned tramps and tankers to fly flags of convenience to avoid the high cost of operating under the U.S. flag. Another reason is that the governments of the countries where these facilities for registration exist have little or no control over the ships flying their flags.

British shipowners must look to HM Government for action at the national level to put the United Kingdom merchant fleet in a better position to meet this competition.

Taxation

The General Council submits that it is now imperative that the Government should bring shipping taxation under review and decide on the further relief which must be accorded to this "unique industry" if it is to be put in a better competitive position when trade revives and shipping is once more earning profits, that being the time when the full force of competition from flags of convenience will again have to be met. The fact that most shipping companies are today paying little or no tax in no sense detracts from the importance of early action.

The General Council has re-examined the various possible means of tax relief and, in the knowledge that the Government has accepted the principle of a special rate of investment allowance for shipping, submits that the present rate of the investment allowance for shipping should be increased and stabilised to aid forward planning. The industry regards the maintenance of the investment allowance at a fixed rate as an essential long-term feature of taxation, as applied to shipping. It further submits that there may be room for greater flexibility in the application of the allowance to shipping.

It is important, however, to point out that there is a special problem arising from the fact that the investment allowance is of limited application to shipowners with a small number of ships and who, in the normal way, do not have a continuous building programme.

To the foregoing specific submission the General Council would add the need for a more positive approach by the Government to the removal of obstacles which taxation puts in the way of the maintenance and development of the United Kingdom merchant fleet. These may, like the balancing charge, appear unimportant when averaged over the whole fleet but fall heavily on particular companies. They may become important in the circumstances of the moment, for example, first, the preceding year basis of assessment at a time of rapidly falling profits and, second, the present irrational basis on which relief is given in respect of trading losses. They may affect one section of the industry, for example, the treatment of the cost of wasting assets effectively debars British owners from acquiring tankers with unexpired time charters when on offer.

The General Council urges that, concurrently with further taxation relief being given to shipping companies carrying on business from the United Kingdom, British owners should be given the same freedom to transfer their activities to other places in the Commonwealth as is enjoyed, for example, by United States citizens who operate ships under the British flag through companies registered in the Commonwealth. Surely, it is altogether anomalous that an American owner, who already has at his disposal the registers of the flag-of-convenience countries, can establish a shipping company in the Commonwealth in circumstances denied to United Kingdom owners, for whom such opportunities are limited in scope and in practice are confined to the operation of new shipping services!

Manning

Ever since the recent difficulties of British shipping were visually demonstrated by laying up of ships, the problems of efficient manning have become greater. Shortages are serious in all departments and these would be accentuated if many more ships came into trading again. British shipping, of course, is in competition for its manpower with British shore industries, but this is the first time when shipowners can recall a shipping slump coinciding with severe manpower shortages in employment ashore.

In an employment market where the effective demand exceeds the supply, it is now a case of a depressed shipping industry competing with relatively prosperous shore industries and with industries which are aided directly or indirectly by the taxpaper. The knowledge that the shipping industry has been having a difficult time in recent years is bound to make parents, teachers and youth think twice about the long-term attractions of a career at sea.

Coastal Shipping

There are no indications of a comprehensive plan to coordinate the transport system of this country as a whole. Much attention is currently being directed to the financial problems of British Railways and the reorganisation of the structure and administration of the British Transport Commission. Similarly, much attention is being devoted to the development of the road system, but there is little or no evidence of any positive Government policy towards the future of coastwise shipping, the other branch of our domestic transport system. It is essential, in the view of the General Council, that, in considering the future of the railways and the relationship between rail and road, the Government should look at the transport needs of the country as a whole, including the part that coastal shipping should properly play. It will not be satisfactory if, having settled the policies for rail and road transport, Government consideration is then given separately to coastwise shipping as being of only marginal interest.

Today, coastal shipping has to meet heavily subsidised competition from the railways and unregulated competition from road haulage. It has also suffered a substantial loss in coastwise coal carryings (the tramp's basic trade) as a result of the fuel policy adopted in relation to waterside electricity power stations, and to industry generally, at a time of temporary shortage of coal. Furthermore, the smaller British ships in the coasting trade are meeting increasing competition from foreign flag tonnage. (A summary of the main recommendations starts on page 17.)



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British Ships From British Shipyards

DELIVERIES OF OCEAN-GOING VESSELS IN 1960

BRITISH OCEAN-GOING PASSENGER AND CARGO LINERS DELIVERED IN 1960

Owners	Name	Tonnage gross	Tonnage d.w.	Pass	Speed	Machinery	Total h.p.	Shipbuilders	Notes
Bank Line	*Elmbank*	8,700	12,000	—	15.75	6-cyl H & W/B & W	7,800	Harland & Wolff, Belfast	One 25-tons; two 10-tons; 12 5-tons; two 3-tons derricks
do.	*Willowbank*	8,525	12,030	—	14.5	4-cyl Doxford	4,800	Wm. Doxford	642,830 cu ft grain; 579,465 cu ft bale
Bibby Line	*Yorkshire*	6,700	10,000	—	16	6-cyl Doxford	8,100	Fairfield S.B. Co	50-tons H.L. derrick
Blue Star Line	*Fremantle Star*	8,400	11,500	6	18	8-cyl Kincaid/B & W	11,000	Cammell Laird	320,000 cu ft refrig; 349,040 cu ft bale
do.	*Canterbury Star*	7,400	8,420	—	17	8-cyl Clark/Sulzer	9,750	Bartram & Sons	30-tons H.L. derrick
British & Burmese S.N. Co	*Donga*	6,300	10,300	—	14	4-cyl Kincaid/B & W	5,850	Lithgows	—
do.	*Dumbaia*	6,300	10,300	—	14	4-cyl Kincaid/B & W	5,850	Lithgows	—
British India Line	*Barpeta*	6,750	7,500	—	16	6-cyl H & W/B & W	5,800	Harland & Wolff, Govan	Five 3-tons cranes
T. & J. Brocklebank	*Mathura*	8,805	10,400	—	16	Geared turbine	7,250	Wm. Hamilton	—
Charente S.S. Co	*Adventurer*	8,900	9,500	—	14.75	6-cyl Doxford	6,800	Wm. Doxford	180-tons H.L. derrick
Clan Line	*Clan MacIlwraith*	7,350	10,000	—	13.75	5-cyl Wallsend/Doxford	5,000	Greenock Dockyard	—
Cunard Line	*Andania*	6,950	9,560	—	17	Geared turbine	9,500	Wm. Hamilton	549,245 cu ft grain;
do.	*Alaunia*	6,950	9,560	—	17	Geared turbine	9,500	Wm. Hamilton	490,680 cu ft bale; 24,500 cu ft refrig
Donaldson Line	*Colina*	1,769	2,500	—	12.5	5-cyl British Polar	2,000	Hall Russell	163,000 cu ft bale
Elder Dempster Lines	*Dunkwa*	6,168	9,550	—	14	4-cyl Doxford	4,500	Scott's S.B. Co	—
Ellerman Line	*City of Worcester*	5,160	8,500	—	14.5	8-cyl Clark/Sulzer	5,040	Caledon S.B. Co	70-tons H.L. derrick
do.	*City of Sydney*	10,800	11,570	—	17.5	9-cyl Sulzer	10,400	Barclay Curle	489,040 cu ft bale; 543,280 cu ft grain; 126,970 cu ft refrig
do.	*City of St. Albans*	4,945	8,350	—	14	8-cyl Sulzer	5,040	Wm. Denny	455,110 cu ft bale
Ellerman's Wilson Line	*Aaro*	2,600	2,900	12	—	7-cyl Fairfield/Sulzer	3,500	Henry Robb	83,000 cu ft refrig
Ellerman & Papayanni Lines	*Rapallo*	3,400	4,150	—	—	7-cyl Clark/Sulzer	3,500	Henry Robb	Eleven 5-tons derricks
do.	*Arcadian*	3,400	4,150	—	—	7-cyl Fairfield/Sulzer	3,500	Henry Robb	
Alfred Holt & Co	*Melampus*	8,500	9,650	12	15	6-cyl Kincaid/B & W	8,000	Vickers-Armstrongs, Walker	35-tons H.L. derrick
do.	*Maron*	9,800	9,800	12	15	6-cyl Kincaid/B & W	8,500	Caledon S.B. Co	35-tons H.L. derrick
Lamport & Holt Line	*Chatham*	3,088	2,500	—	16	7-cyl Sulzer	5,000	Alex Stephen	Two 10-tons; six 5-tons derricks
New Zealand S.S. Co	*Turakina*	7,200	8,200	—	17	8-cyl Clark/Sulzer	10,400	Bartram & Sons	30-tons H.L. derrick
Orient Line	*Oriana*	41,923	1,150	2,184	30.64	Geared turbine	80,000	Vickers-Armstrongs, Barrow	117,500 cu ft bale; 55,000 cu ft refrig
Palm Line	*Ilorin Palm*	5,658	8,500	—	14	4-cyl Doxford	4,500	Swan Hunter, Walker	545,000 cu ft grain; 508,000 cu ft bale
do.	*Lobito Palm*	5,658	8,500	—	17.75	6-cyl Doxford	7,500	Swan Hunter, Walker	300,000 cu ft refrig
Port Line	*Port New Plymouth*	13,085	13,300	12	18	Two 6-cyl Wallsend/Sulzer	14,000	Swan Hunter, Wallsend	70,000 cu ft refrig; 194,680 cu ft bale
Prince Line	*Lancastrian Prince*	4,900	5,500	12	13.25	4-cyl Hawthorn/Doxford	3,300	Burntisland S.B. Co	315,670 cu ft grain; 286,770 cu ft bale
Royal Mail Lines	*Aragon*	20,000	8,000	464	17.5	Two 6-cyl H & W/B & W	17,000	Harland & Wolff, Belfast	435,000 cu ft refrig;
do.	*Arlanza*	20,000	8,000	464	17.5	Two 6-cyl H & W/B & W	17,000	Harland & Wolff, Belfast	45,000 cu ft bale
Shaw Savill Line	*Illyric*	11,350	11,600	—	17	8-cyl H & W/B & W	13,300	Vickers-Armstrongs, Walker	240,000 cu ft bale;
do.	*Icenic*	11,350	11,600	—	17	8-cyl H & W/B & W	13,300	Harland & Wolff, Belfast	400,000 cu ft refrig
Strick Line	*Kohistan*	9,600	12,840	—	14.25	6-cyl Hawthorn/Doxford	6,600	John Readhead	—
Union-Castle Line	*Rothesay Castle*	9,500	10,000	—	16.25	6-cyl Kincaid/B & W	8,600	Greenock Dockyard	450,000 cu ft refrig; 19,000 cu ft bale
do.	*Windsor Castle*	37,640	15,500	850	23	Geared turbine	45,000	Cammell Laird	352,000 cu ft refrig; 271,000 cu ft bale

BRITISH TANKERS DELIVERED IN 1960

Owners	Name	Tonnage gross	Tonnage dw	Machinery	Total hp	Speed	Shipbuilders	Notes
Athel Line	*Athelqueen*	13,040	19,700	6-cyl Doxford	7,500	14.5	Barclay Curle	—
Bowring S.S. Co	*Orlando*	14,154	20,000	7-cyl H & W/B & W	9,500	15.0	Lithgows	978,344 cu ft oil
British India S.N. Co	*Quiloa*	13,251	19,100	Geared turbine	8,000	14.5	Scott's S.B. Co	—
do.	*Ellenga*	24,246	36,000	Geared turbine	16,000	16.0	Swan, Hunter, Wallsend	1,760,410 cu ft oil
Charter Shipping Co	*Derby*	31,791	48,884	Geared turbine	18,000	16.5	John Brown	2,168,360 cu ft oil
do	*Kent*	31,800	49,000	Geared turbine	18,000	16.5	John Brown	2,168,360 cu ft oil
do	*Mantua*	12,900	18,000	Geared turbine	7,500	14.5	Smith's Dock	—
Clyde Charter Co	*British Kiwi*	11,178	13,900	6-cyl Hawthorn/Doxford	7,200	14.5	Smith's Dock	—
do.	*British Robin*	11,211	14,000	6-cyl Kincaid/B & W	8,600	14.5	Lithgows	—
do	*British Gull*	11,156	14,000	6-cyl H & W/B & W	8,600	14.5	Harland & Wolff, Govan	—
do	*British Mallard*	11,174	14,000	6-cyl H & W/B & W	8,600	14.5	Harland & Wolff, Belfast	—
do	*British Curlew*	11,169	15,550	7-cyl Sulzer	8,750	14.5	Alex. Stephen	—
Wm. Cory & Son	*Plumleaf*	12,692	18,100	6-cyl NEM/Doxford	9,500	15.0	Blyth Dry Docks	—
John I. Jacobs & Co	*Pearleaf*	12,353	18,500	6-cyl Rowan/Doxford	8,800	15.0	Blythswood S.B. Co	—
Lowland Tanker Co	*Border Shepherd*	13,600	19,000	6-cyl Kincaid/B & W	8,500	15.5	Lithgows	—
Mobil Tankships	*Mobil Acme*	12,755	18,970	Geared turbine	9,250	15.5	Alex. Stephen	860,000 cu ft oil
do	*Mobil Apex*	12,755	18,970	Geared turbine	9,250	15.5	Alex. Stephen	860,000 cu ft oil
H. E. Moss & Co	*Luxor*	12,700	18,500	6-cyl Doxford	6,800	14.5	Jos. L. Thompson	—
Pacific S.N. Co	*William Wheelwright*	31,320	46,400	Geared turbine	16,000	16.0	Harland & Wolff, Belfast	—
Prince Line	*Stuart Prince*	12,959	18,625	6-cyl Doxford	7,500	14.5	Wm. Doxford	—
Radcliffe Tankers	*Llangorse*	21,846	32,500	Geared turbine	11,000	15.5	Furness S.B. Co	—
Shell Bermuda (Overseas)	*San Conrado*	21,180	32,000	Geared turbine	12,500	15.0	Furness S.B. Co	—
Tanker Finance	*Amoria*	12,323	18,000	6-cyl Hawthorn/Doxford	7,500	14.5	Smith's Dock	—
Warwick Tanker Co	*Brandon Priory*	23,108	35,300	Geared turbine	14,000	15.5	Hawthorn Leslie	—
do	*Bidford Priory*	23,065	34,500	Geared turbine	14,000	15.5	Cammell Laird	—

BRITISH OCEAN-GOING DRY-CARGO TRAMPS AND BULK CARRIERS DELIVERED IN 1960

Owners	Name	Tonnage gross	Tonnage dw	Machinery	Total hp	Speed	Shipbuilders	Notes
Albyn Line	*Thistleroy*	7,919	11,650	4-cyl Doxford	4,400	14.0	Jos. L. Thompson	10-tons derricks
Alexander Shipping Co	*Westbury*	8,530	11,900	5-cyl Hawthorn/Doxford	5,500	13.5	Burntisland S.B. Co	50-tons H.L. derrick
Athel Line	*Athelprincess*	10,295	11,300	5-cyl Hawthorn/Doxford	5,500	13.5	Caledon S.B. Co	Bulk carrier
Atlantic Shipping & Trading Co	*Glanely*	8,260	10,000	4-cyl N.E.M./Doxford	4,800	15.9	Austin & Pickersgill	—
Bamburgh Shipping Co	*Lindisfarne*	12,733	15,300	4-cyl Doxford	4,400	14.0	Jos. L. Thompson	Ore carrier
do	*Longstone*	13,062	15,300	5-cyl Clark/Sulzer	4,500	12.0	Austin & Pickersgill	Ore carrier
Bishopsgate Shipping Co	*Bishopsgate*	12,718	18,100	4-cyl Doxford	4,400	14.0	Sir Jas. Laing	Ore carrier
do	*Aldersgate*	12,718	18,100	4-cyl Doxford	4,400	14.0	Sir Jas. Laing	Ore carrier
Bolton S.S. Co	*Rembrandt*	8,104	10,000	Free-piston gas turbine	4,000	13.0	Smith's Dock	Bipod mast with 5- and 10-tons derricks
Bowater S.S. Co	*Phyllis Bowater*	4,083	4,700	6-cyl Sulzer	2,700	12.0	Wm. Denny	Newsprint carrier
Buries Markes	*La Laguna*	9,306	13,500	4-cyl Doxford	4,800	14.6	Bartram & Sons	Ten 5-tons derricks
Chapman & Willan	*Clearton*	6,073	10,865	3-cyl N.E.M./Doxford	3,150	11.0	Short Bros.	Four 10-tons, eight 5-tons derricks
do	*Brighton*	6,073	10,865	4-cyl N.E.M./Doxford	3,150	11.0	Short Bros.	
H. Clarkson & Co	*Clarkspey*	10,028	12,800	6-cyl Kincaid/B & W	5,800	14.5	Lithgows	701,053 cu ft grain
Hain S.S. Co	*Trewidden*	6,671	10,300	4-cyl Wallsend/Doxford	4,800	14.0	John Readhead	629,750 cu ft. bulk; 559,000 cu ft bale
Hindustan Steam Shipping Co	*Dagheston*	11,204	14,500	4-cyl H & W/B & W	5,500	15.5	Harland & Wolff, Govan	Ore carrier
H. Hogarth & Sons	*Baron Belhaven*	8,337	10,000	4-cyl Hawthorn/Doxford	4,400	13.0	John Readhead	One 25-tons; ten 5-tons derricks
do	*Baron Wemyss*	8,067	10,000	4-cyl N.E.M./Doxford	4,400	14.5	Austin & Pickersgill	
Lyle Shipping Co	*Cape Sable*	10,660	12,500	Geared turbine	5,500	14.0	Wm. Denny	Car carrier
do	*Cape Wrath*	10,905	12,500	Geared turbine	5,500	14.0	Wm. Denny	Car carrier
Montship Lines	*Montcalm*	5,006	11,000	5-cyl Doxford	5,500	15.0	Wm. Doxford	8,800 cu ft refrig.
Moor Lines	*Kirriemoor*	5,923	10,000	5-cyl Doxford	5,500	15.0	Hawthorn Leslie	30-tons H.L. derrick
Ore Carriers	*Joya McCance*	11,871	14,300	5-cyl Doxford	5,500	15.0	Wm. Gray	Ore carrier
do	*Mabel Warwick*	11,632	14,300	5-cyl Doxford	5,500	13.0	Wm Gray	Ore carrier
Scottish Ore Carriers	*Crinan*	7,090	9,000	3-cyl Barclay Curle/Doxford	2,500	11.5	Chas. Connell	Ore carrier
Silver Isle Nav. (Bermuda)	*Silverisle*	7,881	11,600	4-cyl Hawthorn/Doxford	4,400	13.0	Jos. L. Thompson	—
Silver Line	*Silverbeck*	9,542	11,000	4-cyl Doxford	4,400	15.5	Bartram & Sons	Four 10-tons; six 7-tons derricks
Silvertown Services (Shipping)	*Sugar Carrier*	6,358	8,500	7-cyl Sulzer	6,300	16.0	Hall Russell	Bulk sugar carrier
Sir Wm. Reardon Smith	*Devon City*	10,300	12,060	5-cyl Doxford	5,500	14.5	Wm. Doxford	One 25-tons; 14 5-tons derricks
do	*Orient City*	10,300	12,060	5-cyl Doxford	5,500	14.5	Wm. Doxford	
St. Denis Shipping Co	*Monksgarth*	10,760	15,000	4-cyl N.E.M./Doxford	4,400	12.5	Blyth Dry Docks	Ore carrier
Sugar Line	*Crystal Sapphire*	10,295	11,250	5-cyl Hawthorn/Doxford	5,500	14.5	Cammell Laird	Bulk sugar carrier
Trent Maritime Co	*Duke of Mistra*	10,799	15,900	5-cyl Hawthorn/Doxford	5,500	13.5	Furness S.B. Co	830,350 cu ft bale
Vallum Shipping Co	*Iron Barque*	10,950	15,530	4-cyl N.E.M./Doxford	4,400	15.0	Austin & Pickersgill	Ore carrier
do	*Iron Horse*	11,128	14,500	4-cyl Doxford	4,400	15.0	Scott's S.B. Co	Ore carrier

MARINE INSURANCE IN 1960

(*Continued from page 46*)

cover on approved American-flag vessels was to be extended for a further three months; possibly because these changes in the war risk coverage offered to the American shipowners by commercial insurers were still under consideration.

War Risks on Hulls

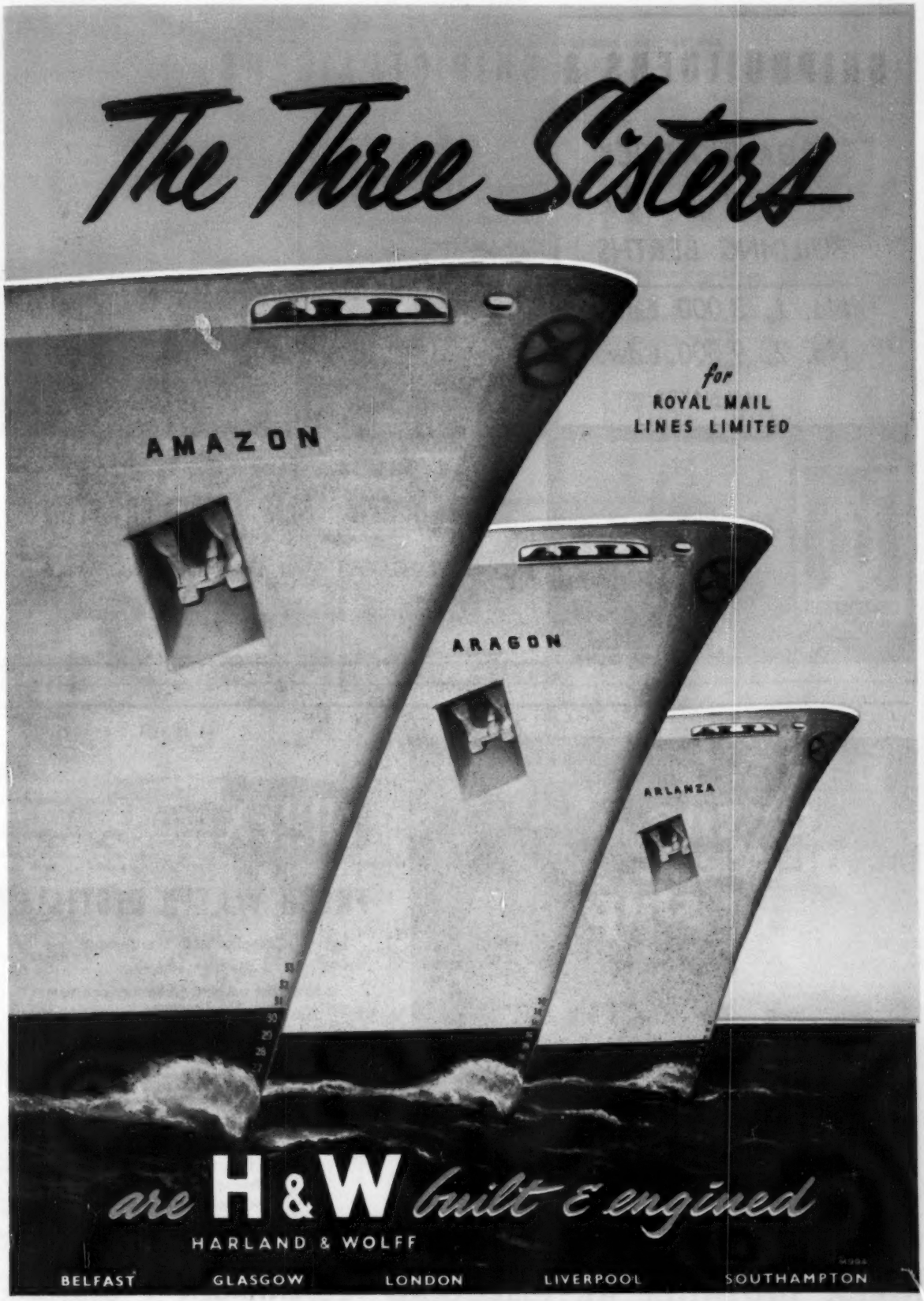
It is, indeed, in the field of war risk insurance on hulls that the year has been of the utmost significance. The conflict of opinion which was associated with the introduction of the War and Strikes Risks Clauses in October 1959 in the British market and the counterpart in the American market, with the innovation of automatic termination of cover in certain events, was far more widespread than many imagined, and gave rise to a very critical examination both of the cover afforded to shipowners and the liabilities accepted by war risks underwriters under the clauses used. There was the curious background to this controversy that the majority of British shipowners being entered in the British War Risks' Association were not concerned, and the war risk cover available in the British market on these controversial clauses was solely used by foreign shipowners who did not otherwise have facilities for insuring war risks on hulls.

The announcement of changes to these clauses in July 1960 and their issue in October 1960 as an alternative to those issued twelve months previously did little to allay the controversy. The changes, when they were first announced, were confined to amendments to the wording of the Automatic Termination Clause to restrict the operation of cancellation to outbreaks of war between five named powers in place of what was considered the rather all-embracing and perhaps ambiguous wording of the October 1959 clauses. Shortly before October 1960, when the clauses were issued, it became known that a voluntary cancellation notice of seven days would also be incorporated, in favour both of the underwriter and the assured. The underwriters decided that these changes merited an increase in the war risk rates, but it is believed that many foreign shipowners did not accept the new clauses and preferred to continue to insure their vessels on the October 1959 clauses. The current developments of opinion in the United States on this subject appear to be on somewhat different lines to those of British underwriters, but so far the practical effects of these differing opinions have not been clarified.

A New Association

In the British market the clash of opinion over war risks clauses has led to an important development among a group of shipowners by the founding of a new War Risks Mutual Insurance Association, under the name Hellenic War Risks' Mutual Association, for the insurance of vessels in which Greek shipping interests are predominant. This new war risks' club started trading on 1 January 1961 and, although the cover offered is essentially that of the existing market cover for war risks and is extensively reinsured with leading Lloyd's and company underwriters in the London market, it has commanded the widest support, both in this country and America.

In his address to the Institute of London Underwriters at the beginning of the year Mr Harold Hopwood, the chairman, said that despite the better economic climate this was not the time to enjoy a spree of undue competition or optimism. "Realism is needed rather than pious hope", and these words might well be the comment of every marine underwriter in his summary of the underwriting year of 1960.

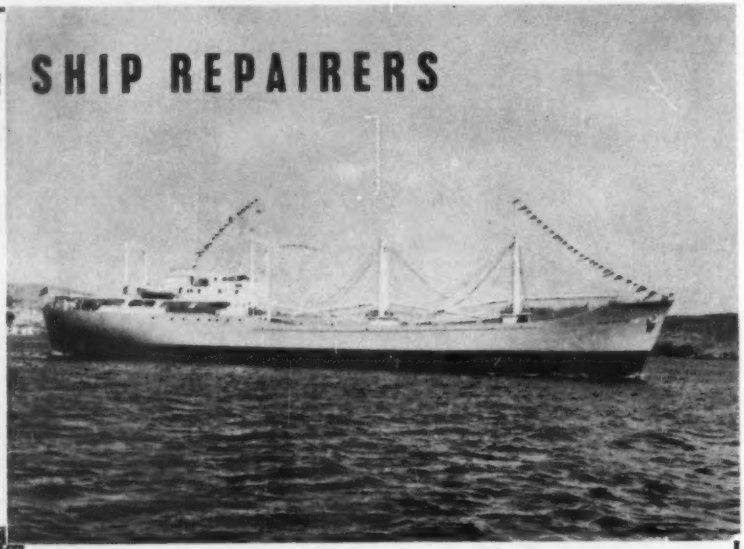


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OCEAN-GOING SHIPS BIULT IN BRITISH YARDS FOR OVERSEAS REGISTRY, 1960

Owners	Name	Type	Tonnage gross	Tonnage d.w.	Machinery	Total h.p.	Speed	Shipbuilders	Notes
Cuba:									
Oficina de Fomento Maritimo Cubano	*Habana*	Cargo	2,945	4,100	Two Ruston	3,360	—	Atlantic S.B.	Bulk sugar carrier
Liberia:									
Monrovia Shipping Co ...	*Pearl Haven*	Cargo	8,693	12,800	4-cyl Doxford	4,800	14	Wm. Gray	One 20-tons; two 10-tons; eight 5-tons derricks
do. ...	*Pearl Clipper*	Cargo	8,860	12,900	4-cyl Doxford	4,800	13	Wm. Doxford	Two 10-tons; eight 5-tons; two 3-tons derricks
New Zealand:									
New Zealand Govt.	*Moana Roa*	Cargo pass.	2,893	1,750	Two 7-cyl Clark/Sulzer	2,800	14.5	Grangemouth Dockyard	40 passengers
Norway:									
Sig. Bergesen	*Tresfonn*	Bulk carrier	12,900	18,000	5-cyl H & W/B & W	7,000	14.5	Harland & Wolff, Belfast	—
Den Norske Amerikalinje A/S	*Vistafjord*	Bulk carrier	9,945	14,000	4-cyl Kincaid/B & W	5,600	14.25	Swan Hunter, Wallsend	660,780 cu ft bale
Texas Co (Norway) A/S ...	*Texaco Oslo*	Tanker	13,000	19,000	6-cyl Rowan/Doxford	8,800	14	Blythswood S.B.	—
Venezuela:									
Cia. Shell de Venezuela ...	*Shell Aramare*	Tanker	22,000	33,000	Geared turbine	11,000	15.5	Fairfield S.B.	—
do. ...	*Shell Naiguata*	Tanker	22,000	33,000	Geared turbine	11,000	15.5	Fairfield S.B.	—

OCEAN-GOING SHIPS BUILT IN OVERSEAS YARDS FOR BRITISH REGISTRY, 1960

Where Built and Owners	Name	Type	Tonnage gross	Tonnage d.w.	Machinery	Total h.p.	Speed	Shipbuilders	Notes
France:									
Buries Markes	*La Estancia*	Cargo	10,000	13,800	7-cyl Gotaverken	5,800	14	Forges et Ch. de la Mediterranee	730,917 cu ft bale
do.	*La Sierra*	Cargo	10,000	13,700	7-cyl Gotaverken	5,880	14.25	Forges et Ch. de la Mediterranee	
Flower Line	*La Primavera*	Cargo	10,000	13,700	7-cyl Gotaverken	5,800	14	Forges et Ch. de la Mediterranee	
Germany:									
London & Overseas Bulkcarriers	*Oversea Courier*	Bulk carrier	19,200	28,000	7-cyl M.A.N.	7,860	14.4	Rheinstahl Nordseewerke	1,262,547 cu ft bale
Norcape Shipping Co (Bermuda)	*Naess Spirit*	Tanker	38,000	66,405	Geared turbine	19,000	16.2	Kieler Howaldtswerke	—
Norness Shipping Co (Bermuda)	*Naess Pioneer*	Bulk carrier	20,200	27,650	7-cyl M.A.N.	7,860	14.5	Rheinstahl Nordseewerke	—
Shaw Savill & Albion	*Amalric*	Cargo	7,800	8,685	9-cyl M.A.N.	10,100	18	Bremer Vulkan	—
Standard-Vacuum Tankers ...	*Stanvac Progress*	Tanker	9,800	14,000	Geared turbine	6,640	14	Schlieker Werft	728,270 cu ft oil
Surrey Shipping Co	*Tenadores*	Refrig. cargo	6,716	5,875	Geared turbine	8,600	17.5	Bremer Vulkan	—
do.	*Tetela*	Refrig. cargo	6,738	5,875	Geared turbine	8,600	17.5	Bremer Vulkan	—
do.	*Turrialba*	Refrig. cargo	6,738	5,875	Geared turbine	8,600	17.5	Bremer Vulkan	—
United Baltic Corp	*Baltic Sprite*	Cargo	1,599	2,200	8-cyl M.A.N.	2,520	14.25	Krogerwerft	—
Italy:									
BP Tanker Co	*British Lantern*	Tanker	24,000	35,200	Geared turbine	14,000	17.24	Cant. Riuniti dell' Adriatico	—
do.	*British Comet*	Tanker	22,300	35,000	Geared turbine	15,500	16.5	Cant. Riuniti dell' Adriatico	—
Esso Petroleum Co	*Esso Dublin*	Tanker	24,000	36,040	Geared turbine	16,000	17	Cant. Riuniti dell' Adriatico	—
Japan:									
Overseas Tankships (UK) ...	*Caltex Plymouth*	Tanker	30,000	45,800	Geared turbine	17,500	16.25	Hitachi S.B. Co, Innoshima	—
Netherlands:									
Anglo American Shipping Co ...	*Naess Endeavour*	Tanker	31,500	47,600	Geared turbine	17,600	17	Nederlandsche Dok	—
Falaise S.S. Co	*Finnamore Valley*	Cargo	7,305	12,500	6-cyl Sulzer	7,000	18	Kon. Mij. "De Schelde"	—
Medomsley Shipping Co ...	*Chelwood Beacon*	Tanker	21,300	32,000	Geared turbine	14,500	—	Rotterdamsche Droogdok	—
Sweden:									
Naessholm Shipping Co ...	*Naess Clansman*	Tanker	16,400	25,850	9-cyl B & W	11,200	16.5	Eriksbergs	1,246,246 cu ft oil
Pool Shipping Co	*Willowpool*	Cargo	12,290	10,500	6-cyl Gotaverken	5,000	14.5	Finnboda Varf	659,600 cu ft grain; 530,900 cu ft bale
Chr. Salvesen & Co	*Saldura*	Cargo	8,929	12,705	9-cyl Gotaverken	5,600	15	Oskarshamns Varv	14 5-tons; two 10-tons; one 30-tons derricks

PRODUCTION OF PROPULSION MACHINERY FOR MERCHANT SHIPS

Engine Builders	Type	No of Sets	Total ihp
Aitchison, Blair Ltd	Diesel	6	8,820
Barclay, Curle & Co Ltd	Diesel	3	28,820
	Turbine	1	17,800
British Polar Engines Ltd	Diesel	22	23,990*
John Brown & Co (Clydebank) Ltd	Turbine	2	36,000†
Geo. Clark (Sunderland) Ltd	Diesel	6	42,960
	Recip.	1	864
Crossley Brothers Ltd	Diesel	47	28,280*
Wm. Denny & Bros Ltd	Diesel	2	10,375
	Turbine	2	13,300
Wm. Doxford & Sons (Engineers) Ltd	Diesel	11	75,870
Fairfield Shipbuilding & Engineering Co Ltd ...	Diesel	3	16,400*
	Turbine	1	11,000†
	Recip.	2	2,880
Wm. Gray & Co Ltd	Diesel	2	11,000*
Harland & Wolff Ltd	Diesel	11	129,040
	Turbine	3	128,700
Hawthorn Leslie (Engineers) Ltd	Diesel	8	48,650*
	Turbine	3	32,000†
C. D. Holmes & Co Ltd	Diesel	4	7,050*
J. G. Kincaid & Co Ltd	Diesel	8	71,950

Engine Builders	Type	No of Sets	Total ihp
Mirrlees, Bickerton & Day Ltd	Diesel	102	63,801*
National Gas & Oil Engine Co Ltd	Diesel	37	10,307*
North Eastern Marine Engineering Co Ltd ...	Diesel	7	39,900
Parsons Marine Turbine Co Ltd	Turbine	8	130,080
Rankin & Blackmore Ltd	Recip.	1	3,000
	Free-piston gas turbine	2	5,500†
Richardsons Westgarth (Hartlepool) Ltd	Turbine	2	45,600
David Rowan & Co Ltd	Diesel	2	17,025
	Turbine	2	16,985
Ruston & Hornsby Ltd	Diesel	183	25,826*
Scotts' Shipbuilding & Engineering Co Ltd ...	Diesel	3	16,800
Alex. Stephen & Sons Ltd	Diesel	1	7,750*
	Turbine	2	17,850†
Swan, Hunter & Wigham Richardson Ltd	Diesel	3	24,800
Vickers-Armstrongs (Engineers) Ltd	Turbine	2	52,000
Wallsend Slipway & Engineering Co Ltd	Diesel	5	60,300
	Turbine	1	
H. Widdop & Co Ltd	Diesel	7	3,368*

* bhp † shp

NEW CONTRACTS

Shipowners	No. of Ships	Type	Tons d.w. (gross)	Dimensions (ft.) L.b.p.(o.a.) × B. × D.(dft.)	Delivery	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Yards in Great Britain and Northern Ireland										
Metcalf Motor Coasters	1	Coaster	(1,630)	234×36×(14.5)	—	—	Two diesels	1,320	Lister Blackstone	Burntisland S.B. Co
Indo-China S.N. Co	1	Cargo	7,000	—	—	—	Doxford diesel	—	—	Jos. L. Thompson & Sons
Overseas Yards										
German owner	1 (321)	Cargo	5,000/7,000	—	—	—	Diesel	—	—	Schiffswerft August Pahl
Liberian National Shipping Line	2	Bulk carrier	35,000	—	—	—	—	—	—	Verolme United Shipyards
Flotta Lauro	1	Pass.	(20,000/30,000)	—	—	—	Geared turbine	—	—	Ansaldo S.A.
Panama Transport Co (Esso Group) and Esso Nederland N.V.	*2 (636/638)	Tanker	84,300	820(855)×125×(14.9)	1962/3	—	Geared turbine	—	Shipbuilders	Verolme United Shipyards
Holland-Amerika Line	1	Cargo	10,000	500	1962	—	M.A.N. diesel	—	Shipbuilders	N.V. Wilton-Fijenoord
Canadian owners	1	Bulk carrier	24,000	—	—	—	Geared turbine	—	—	Verolme Cork Dockyard
Norwegian owners	1 (336)	Bulk carrier	17,000	—	—	—	—	—	—	Rheinstahl Nordseewerke
German owners	2	Cargo	4,150	—	—	—	Diesel	—	—	Rheinstahl Nordseewerke
Reederei Bernhard Schulte	1 (508)	Cargo	4,300	—	1961	14	Diesel	—	—	Jos. L. Meyer

* Size of vessels increased from 78,000 dwt.

LAUNCHES

Date	Shipowners	Ship's Name and/or Yard No.	Type	Tons d.w. (gross)	Dimensions (ft.) L.b.p.(o.a.) × B. × D.(dft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Overseas Yards										
Dec. —	Zim Israel Nav. Co	*Beersheba* (909)	Cargo	10,300	435.95×62×36(25.95)	15.25	M.A.N. diesel	5,400	Shipbuilders	Bremer Vulkan
Dec. —	Cargoships El Yam	*Har Sinai*	Bulk cargo	23,000	520×74×448.25(34.58)	15.25	Diesel	9,100	M.A.N.	Deutsche Werft
Dec. 14	Hercules Tankers Corp.	*Stanvac Meridian* (4577)	Tanker	46,000 (27,900)	705×102×50(38)	16.5	Geared turbine	15,000	Shipbuilders	Bethlehem-Sparrows Point
Dec. 14	Rederi A/B Ragne	*Birgit Ragne* (222)	Cargo	5,900 (3,000)	344.5×50.5×(23.5)	14.5	Diesel	5,900	Burmeister & Wain	Ekensbergs Varv
Dec. 14	Rederi A/B Svenska Lloyd	*Gallia* (1070)	Cargo	4,600 (3,000)	321×47.5×30.25(22.5)	15	G.V. diesel	3,000	Shipbuilders	Lindholmens Varv
Dec. 14	Booth S.S. Co (Lamport & Holt Line)	*Sheridan* (275)	Cargo	2,350 (1,594)	—	—	Diesel	2,400	Sulzer Bros	T. van Duivendijk's Scheeps.
Dec. 15	U.S.S.R.	*Andrey Zakharov*	Fish factory	(12,000)	—	—	—	—	—	Admiralty Shipyard, Leningrad
Dec. 16	Zim Israel Nav. Co	*En Gedi* (768)	Bulk carrier	23,000 (15,000)	519.95×74×48.25 (34.5)	15	Diesel	9,000	M.A.N.	Deutsche Werft
Dec. 16	August Bolten	*Mathilde Bolten* (518)	Cargo	16,600 (12,000)	493.67×66.25×44.25 (32.1)	15.6	Fiat diesel	8,400	Borsig	Lubecker Flender-Werke
Dec. 17	London & Overseas Freighters	*London Independence* (136)	Tanker	34,000 (22,000)	(698.33)×88×47(35.2)	16.75	Tw.-scr. 8-cyl G.V. diesels	15,000	Shipbuilders	Uddevallavarvet
Dec. 17	Anders Jahre, Oslo	*Kronprins Harald* (1096)	Pass. ferry	(7,500)	408.25(460.2)×59.95* (17.25)	21	Tw.-scr. M.A.N. diesel	9,600	Shipbuilders	Kieler Howaldtswerke
Dec. 17	Vereenigde Nederlandsche Scheep. Mij.	*Streefkerk* (495)	Cargo	12,000 (9,500)	480(520.67)×69×39(29.5)	18	9-cyl diesel	10,600	Gebr. Stork	Nederlandsche Dok
Dec. 19	Sven Salen	*Sea Serpent* (170)	Tanker	40,000 (25,700)	670(700.2)×96×48.25 (35.75)	17.1	10-cyl diesel	18,350	Gotaverken	Oresundsvarvet
Dec. 20	American President Lines	*President Tyler* (5489)	Cargo	12,768 (12,500)	528×76×44(27)	20	Geared turbine	17,500	—	Bethlehem Steel Co, San Francisco
Dec. 20	A/S Athene v/Jorgen Bang	*Atalante* (470)	Tanker	40,500 (26,800)	665(699.5)×97×49.25 (36.58)	17	12-cyl M.A.N. diesel	16,200	Shipbuilders	Kockums M.V.
Dec. 22	Heron Inc (Niarchos group)	*World Hope* (1601)	Tanker	24,700 (16,270)	580×76.5×42.58	15.6 (T)	Stork diesel	8,400	N.D.S.M.	Hellenic Shipyard
Dec. 22	Supertanker Corp.	*Samson* (206)	Tanker	33,600 (21,400)	628.75×86.75×46.5 (35.25)	17	Parsons geared turbine	15,000	C.E.M.	Ch. Navals de la Ciotat

TRIAL TRIPS

Date	Shipowners	Ship's Name and/or Yard No.	Type	Tons d.w. (gross)	Dimensions (ft.) L.b.p.(o.a.) × B. × D.(dft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Yards in Great Britain and Northern Ireland										
Dec. 14	Mobil Tankships	*Mobil Apex* (668)	Tanker	19,000 (12,470)	525×74×39(30.75)	15.5	Geared turbine	9,250	Shipbuilders	Alex. Stephen & Sons
Overseas Yards										
Nov. 18	Canadian Dept. of Transport	*Hopedale*	Pass. cargo	310 (1,000)	170.25(190)×38×20(12.5)	13	Tw.-scr. diesel	2,200	Fairbanks Morse	Collingwood Shipyards
Dec. —	Messageries Maritimes	*Ventoux* (304)	Cargo	9,300 (6,507)	481(511.9)×64.67×39.42(26.25)	18	11-cyl B & W diesel	13,700	Schneider	Ch. et. At. de Provence
Dec. —	Soc. Francaise des Transports Petroliers	*Bearn* (198)	Tanker	51,500 (31,300)	712(758.33)×99.33×54.9(40.5)	17.4	Parsons geared turbine	20,200	C.E.M.	Ch. Navals de La Ciotat
Dec. 6	Nornaess Shipping Co (Bermuda)	*Naess Pioneer* (320)	Bulk carrier	27,650 (20,200)	597(636.75)×79.75×49.42(32)	14.5	7-cyl diesel	7,860	M.A.N.	Rheinstahl Nordseewerke
Dec. 14	Kon. Nederlandsche Stoomboot Mij.	*Parthenon* (803)	Cargo	4,500 (3,600)	335(363.9)×49×26.5(21.5)	16	8-cyl diesel	3,600	Gebr. Stork	C. van der Giessen & Zonen
Dec. 14	U.S.S.R.	*Vladivostok*	Pass.	(4,722)	360.9(400.75)×52.5×33.75(16.95)	18	Two M.A.N. diesels	8,000	D.M.R.	VEB Mathias Thesen Werft
Dec. 15	A/B Turret O/Y	*Pronto* (620)	Tanker	19,900 (12,868)	538(559.67)×71.9×39.33(29.75)	15.3	9-cyl M.A.N. diesel	7,500	Shipbuilders	Verolme United Shipyards
Dec. 15	Rederi A/B Soya	*Soya Maria* (748)	Tanker	40,420 (25,902)	670(699.95)×96×48.25(35.95)	17	Geared turbine	17,500	Shipbuilders	Gotaverken
Dec. 22	Rederi A/B Dalen	*Bonita* (467)	Bulk carrier	15,300 (10,200)	468(500.33)×65×40 (25.58)	14	6-cyl M.A.N. diesel	5,220	Shipbuilders	Kockums M.V.
Dec. 27	Salenrederiana	*Atitlan* (557)	Refrig. cargo	8,300 (8,080)	450×62×30.67(27.5)	19	8-cyl B & W diesel	10,000	Shipbuilders	Eriksbergs
Dec. 30	Anglo American Shipping Co	*Naess Endeavour* (494)	Tanker	47,600 (31,500)	705.5(740.75)×103.5×50(37.5)	17	Parsons turbine	17,600	Shipbuilders	Nederlandsche Dok
Dec. 30	Vereenigde Nederlandsche	*Serooskerk* (634)	Cargo	12,200 (10,000)	480(528.25)×69×39(29.5)	18	9-cyl B & W diesel	11,250	Shipbuilders	P. Smit Jnr.

MARITIME NEWS IN BRIEF

MR W. A. MATHER, chairman of the Canadian Pacific Railway Company, Canadian Pacific Airlines Ltd, and Canadian Pacific Steamships Ltd, has died. Before his election as the seventh president of the C.P.R. in March 1948, he had been vice-president at Winnipeg for six years.

MR N. A. MORLING, who is a director of Turner & Newall Ltd and chairman of Turner Brothers Asbestos Co Ltd, J. W. Roberts Ltd, and Glass Fabrics Ltd, has retired from the boards of those companies. Mr G. S. Sutcliffe, who is also a director of Turner & Newall Ltd, has assumed the chairmanship of the three subsidiaries. Mr Sutcliffe, who is at present chairman of Ferodo Ltd, has retired from the board of that company and Mr Morling, who was appointed to the board on 1 July 1960, will assume the chairmanship.

THE death has occurred of Mr G. F. Silley, former general manager and director of R. & H. Green & Silley Weir Ltd.

CAPTAIN H. R. B. KENT, of Tynemouth, has been re-elected Master of Trinity House, Newcastle. This is the ninth successive year that he has been elected master and he has now held the post on no fewer than 15 occasions since first elected in 1919.

MR A. MCDOUGALL has relinquished his appointment as director and general manager of the Prince of Wales Dry Dock Co Swansea Ltd and of Port Talbot Dry Dock Co Ltd. Mr J. Elliot Morgan has been appointed general manager and Mr A. Foulds, the company's secretary, joint general manager.

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THE CUNARD LINE has again carried the largest number of passengers across the Atlantic by sea during 1960. The total carried reached 207,563, which is 23.95 per cent of the combined total of passengers carried by all the trans-Atlantic steamship lines last year. The liners *Queen Elizabeth* and *Queen Mary* carried a combined total of approximately 110,800 passengers in 1960, representing 17.28 per cent of the total passengers carried in the North Atlantic trade. Cruises from New York by the *Caronia*, *Mauretania* and *Britannic* proved highly popular with a total of 9,626 passengers.

JAMES NOURSE LTD, a subsidiary of the Peninsular & Oriental Steam Navigation Company, announce that, subject to the necessary consents of Indian authorities, an offer of 60s per share will shortly be made on their behalf for all the shares of the Asiatic Steam Navigation Co Ltd, which is another member of the P & O Group. The purpose of the offer is to enable the operations of Asiatic to be more completely integrated with those of the Group.

THE FUNCTIONS of the Superintendent of the Mercantile Marine Office, Barry, have been transferred to HM Customs & Excise. The address of the office is unchanged, 41 Dock View Road, Barry, Glam. (telephone: Barry 1795).



CAPTAIN A. E. COLES has succeeded Capt N. W. Smith as Commodore of the Orient Line. Capt Coles received his early sea training with the MacAndrews Line. He joined the Orient Line in January 1928 as fourth officer of the "Osterley". As a member of the R.N.R. he was on Naval service during the war. He was engaged in mine sweeping and convoy escort duties and was present at the 1942 Dieppe Assault and the 1944 landings in Normandy and the Scheldt. On his return to the Orient Line he became chief officer of the "Orion". He was given the command of "Ormonde" in 1951. He has subsequently commanded "Otranto", "Orontes" and "Orion"

VICE-ADMIRAL SIR NORMAN DALTON has taken up an appointment as technical consultant to J. Stone (Holdings) Ltd, and has joined the board of Epsylon Industries Ltd, the electronic engineers. Both these companies are members of the Stone-Platt Industries group.

MR KJELL ANDERSEN has been appointed managing director of the Swedish Lloyd Shipping Co, Gothenburg, in succession to Mr K. R. Bökman, who is to retire at the 1961 annual meeting. Mr Andersen joined the Swedish Lloyd in 1924 and was appointed vice-managing director in 1952. The new vice-managing director will be Mr T. Christoffersen.

MR H. J. F. MILLS has retired from the board of J. B. Westray & Co Ltd and Mr H. T. Beazley and Mr J. B. Currie have been appointed directors.

MR HORACE WILLSON, president of William Hamilton & Co Ltd, Shipbuilders, Port Glasgow, has died.

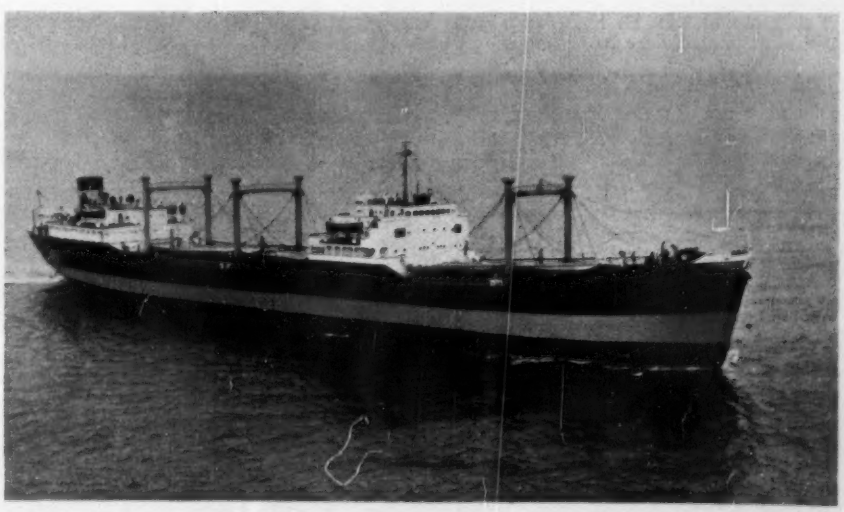
MR R. CLARKE has resigned from the board of Laurence, Scott & Electromotors Ltd, of which he was marine sales director. Mr J. B. Wormall, formerly industrial sales director, is now sales director for all the company's products. Mr J. Callf, who was the chief estimator of the marine department, has become marine sales manager.

CAPTAIN J. V. LE GRAND, the only surviving sailor to have served in the *Cutty Sark*, has died. He was 91.

MR J. C. COLQUHOUN has retired as chairman of The Manganese Bronze & Brass Co Ltd. Mr J. C. Budd has been appointed chairman to succeed him and Mr R. Dennis Poore has been appointed a director.

FROM TANKER TO BULK CARRIER

One of the largest conversions carried out in the U.K. for many years, the bulk carrier "Duffield", 13,200 dwt, has entered service. The work was carried out by the North Shields yard of Smith's Dock Co Ltd, who completed the job in 16 weeks. Owned by Hunting & Son Ltd, Newcastle, the vessel was formerly a motor tanker of 14,859 dwt built by Smith's Dock in 1952. The conversion consisted of the removal of all the longitudinal bulkheads, sixty per cent of all transverse bulkheads, and the upper deck in way of all hatchways, and other steelwork. The remaining transverse bulkheads were repositioned: a tank top was fitted at the level of the transverses throughout the cargo tanks, together with sloping hopper tanks at the sides and sloping saddle tanks at deck level





MR ALEXANDER DE LARRINAGA has joined David Rowan & Co Ltd as assistant to the works director. After leaving Cambridge in 1955 he went to Cammell Laird & Co Ltd. He worked as a design engineer for a time and was then seconded to B.S.R.A. to gain experience in research. After a short period attached to the production planning and control department he became assistant manager of the outside engineering department responsible for the fitting-out of engine rooms. His last post with Cammell Laird was as assistant production manager

MR A. B. NORMAND has been appointed a director of H. Clarkson & Co Ltd.

MR C. R. GOODCHILD, librarian of the Seafarers' Education Service, has been awarded the M.B.E. in the New Year's Honours List. He retired on December 31 after 33 years' work with the service. Mr Goodchild has been succeeded by Mr Frank Bryan, his deputy for 14 years.

MR NORMAN DANIEL, who has been assistant general manager of Semtex Ltd, is taking over the post of general purchasing manager for the Dunlop Group. He succeeds Mr D. J. Flunder who is taking up a senior position in the Tyre Division.

MR A. H. BROWN is retiring after 50 years' service with Killick Martin & Co Ltd, shipbrokers.

CAPTAIN ERNEST KINGAN has been appointed commodore of the Elder Dempster Lines fleet. After joining the company in 1919 he was subsequently promoted to third officer of *Biafra* in 1924, second officer of *Benin* in 1926, chief officer of *Calumet* in 1935, and had his first command as master of *Bourbonnais* in 1945. He succeeds Commodore Sweeney, who retired recently.

• • • •

PROVISIONAL STATISTICS for 1960 reveal a 31.4 per cent increase in passenger traffic carried by BOAC compared with 1959. The figures show that the Corporation carried some 748,900 passengers compared to 569,942 in 1959. Other provisional figures for 1960 also show large increases. Passenger miles flown, at 2,351,600,000 were up 29.3 per cent compared to the 1959 figure. Mail short ton miles were up 22.1 per cent at 28,530,000. Freight short ton miles, increased by 7.9 per cent to 42,956,000. Capacity ton miles offered also show a large jump of 26.2 per cent—530,739,000 compared to 420,458,000.

MR A. BROOMHEAD has been appointed deputy managing director of Thos. Firth & John Brown Ltd. Mr F. Wortley, a director of the firm, has been appointed general works manager.

MR C. G. JAMES has been appointed managing director of Fairey Marine Ltd. He has been manager of the company's works at Hamble since July 1958 and was elected to the board in February 1959. Mr James succeeds Mr C. H. Chichester Smith who will retain the chairmanship. Mr Charles Currey and Mr A. R. Sibley have been appointed directors.

MR L. T. JORDAN has been appointed assistant managing director of the Kuwait Oil Co Ltd and Mr E. C. Masterson has been appointed general manager, London.

MR A. H. WILSON, senior engineer and ship surveyor in the Consultative Branch of the Ministry of Transport, has been appointed chief examiner of engineers.

MR L. A. WAITE and Mr R. G. Bradshaw have been appointed directors of Howard Houlder & Partners Ltd, ship and insurance brokers.

MR N. C. HAUGHEY, secretary of the Verolme Cork Dockyard Ltd since its formation, has resigned.

MR R. A. O'CONNOR has been elected to the board of Cammell Laird & Co Ltd.

THE REV RONALD REDFERN, until recently senior chaplain at the Victoria Dock Road Institute of the Missions to Seamen, has retired after six years at the Institute.

BRITISH UNITED AIRWAYS are to operate the first direct air service between London and Las Palmas in the Canary Islands. The first flight will be on March 5 and frequency will initially be once weekly, increasing according to traffic demand. The service will be flown with the latest-type Viscounts, leaving London (Gatwick Airport) on Sunday evening, flying direct to Las Palmas with only one refuelling stop en route, and the return flight departs from Las Palmas on Monday morning. Combined air/sea return journeys, travelling one way by British United Airways and the other by Union-Castle ships, can also be arranged.

THE SVENSKA AMERIKA LINIEN has invited tenders from Swedish and foreign yards for extensive improvements to the liner *Kungsholm*. The work, which is to be carried out next autumn, will include the installation of Denny-Brown stabilisers of the same size and type as those fitted in the *Gripsholm*. Other work will include the conversion of about 50 four-berth cabins on the upper and main decks, at present provided with private showers, to two-berth cabins with private bath.

QUEEN ELIZABETH THE QUEEN MOTHER is to launch the Shaw Savill Line passenger vessel *Northern Star* on June 27. *Northern Star* is being built by Vickers-Armstrongs Ltd at the Naval Yard, Walker-on-Tyne, and is expected to make her maiden voyage in July 1962.

THREE NEW COMPANIES are joining the Derritron Electronics group, all of which specialise in various fields of non-domestic electronic equipment. The group, formed only in January 1960, will now be virtually self-contained. The new additions are Beulah Electronics Ltd, which recently introduced a revolutionary close-circuit TV camera; Direct TV Windings Ltd, which manufactures transformers and coil winders, and Direct TV Replacements Ltd, a components distributor to retail and industrial users.

THE MARYLAND PORT AUTHORITY has established a new trade development office in London. The London office will be headed by Mr A. G. Tofield.

THE INTERNATIONAL MARINE RADIO CO LTD, on contract from the Ministry of Aviation, is supplying duplicated medium-frequency radiobeacon radiotelegraph transmitters to each of three new Ocean Weather Ships. Each transmitter provides maritime M.F. radiotelegraph facilities in the frequency range 405-525 Kcs and radiobeacon transmission in the frequency range 325-405 Kcs. Output power is at least 200 watts in each case.

THE UNION-CASTLE LINE spend as much as £30,000 a year in renting films for the free entertainment of the passengers in their 13 big liners.

FIFTY YEARS AGO

From THE SHIPPING WORLD of 11 January 1911

It is announced that the P. & O. Company are in future to devote the steamers of their branch service to the conveyance of one class of passengers only to Australia, via the Cape, at fares ranging from £16 to £25. For this purpose the present fleet is being remodelled, and the two 11,000 ton steamers, *Bendigo* and *Ballarat*, now in course of construction, will be arranged on similar lines. The vessels will be exceptional in providing accommodation on upper deck amidships at cheap fares, and there is no doubt that this advantage, coupled with the popular "one-class" principle, will find much favour with the travelling public between England, the Cape, and Australia.

The new White Star leviathans *Olympic* and *Titanic* have just been insured in London for twelve months' trading on a value of £1,000,000 each. As each steamer is understood to be worth £1,500,000, the owners will presumably run a risk of £500,000 a piece. In addition to this they have to carry the first £150,000 of all claims, for underwriters only pay the excess of this amount. The Cunarders *Lusitania* and *Mauretania* are insured on a valuation on £800,000 each, but another £200,000 is covered against total loss.

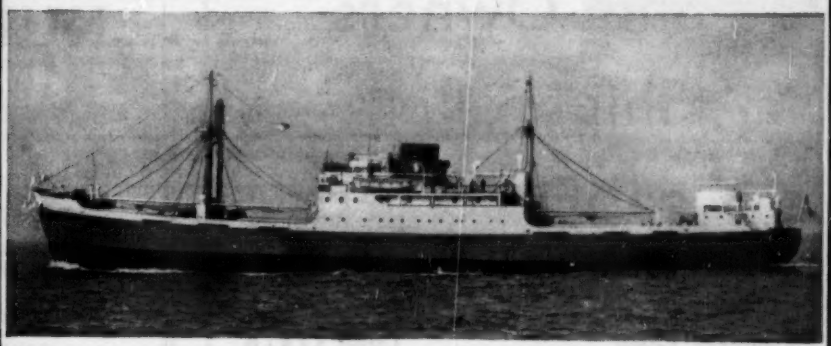
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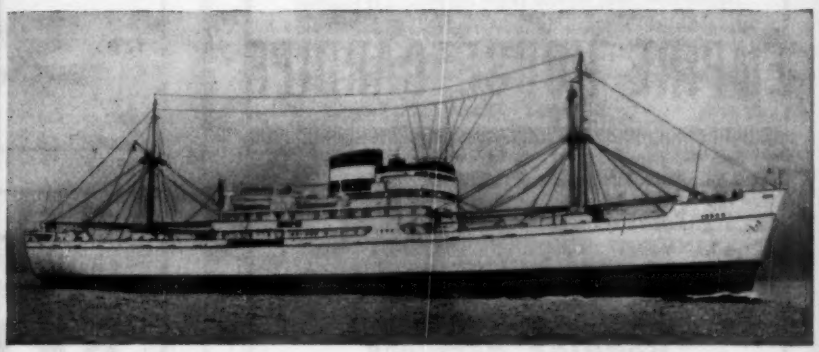
M.S. VALDES
Owners: MacAndrews & Co. Ltd.

Builders: Nobiskrug Werft, Rendoburg.



M.V. CYPRIAN PRINCE
Owners: Prince Line Ltd.

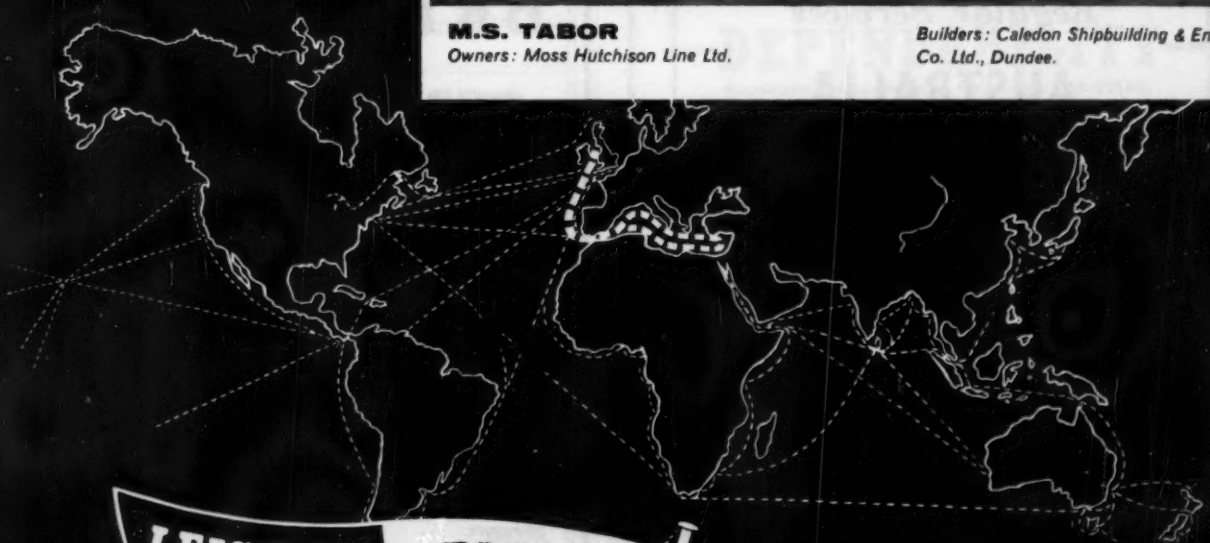
Builders: Burntisland Shipbuilding Co. Ltd., Burntisland.



M.S. TABOR
Owners: Moss Hutchison Line Ltd.

Builders: Caledon Shipbuilding & Eng. Co. Ltd., Dundee.

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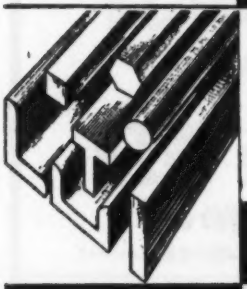
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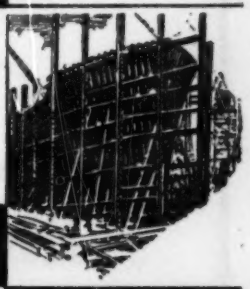
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INDEX TO ADVERTISERS IN THIS ISSUE

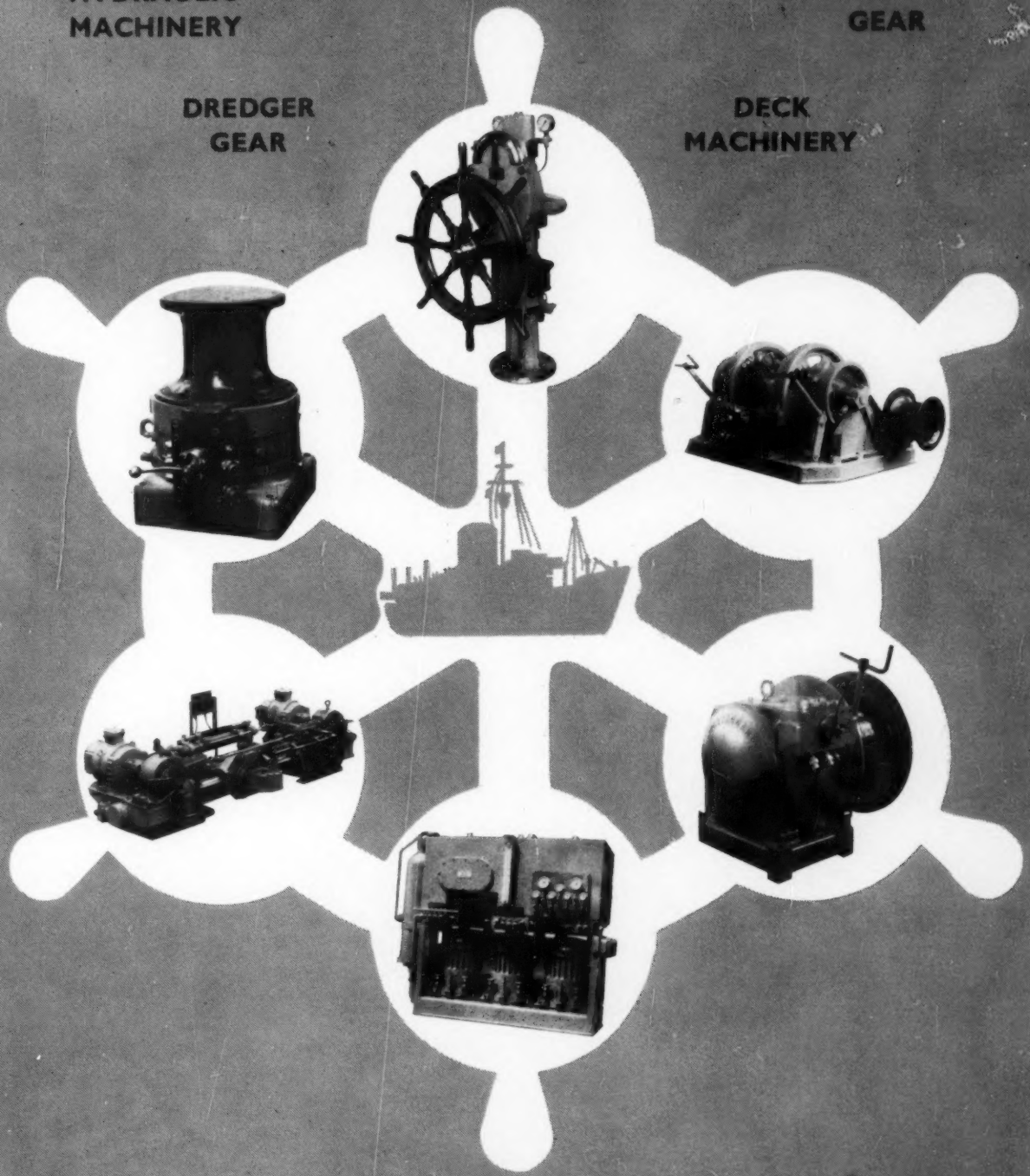
	Page
Aarhus Flydedok og Maskinkompagni	A38
Abram Ltd., Henry	A70
American President Lines	A93
Angular Hole Drilling & Manufacturing Co. Ltd.	A84
Arnell & Co. Ltd., Charles C.	A86
Associated British Combustion Ltd.	A44
Austin & Pickersgill Ltd.	A47
Babcock & Wilcox Ltd.	A43
Bank Line	A33
Bannister & Co. Ltd., Ed.	A24
Barclay Curle & Co. Ltd.	A55
Beaufort (Air-Sea) Equipment Ltd.	Front Cover
Belliss & Morcom Ltd.	A71
Ben Line	A50
Berk & Co. Ltd., F. W.	A44
Bernard & Sons Ltd., C. H.	A36
Besse & Co. (Aden) Ltd., A.	A26
Best & Lloyd Ltd.	A6
Bibby Bros. & Co.	A97
Bilbrough & Co. Ltd., A.	A94
B.I.P. Chemicals Ltd.	A85
Birt, Potter & Hughes Ltd.	A92
Blundell & Crompton Ltd.	A62
Blyth Dry Docks & Shipbuilding Co. Ltd.	A19
Blythswood Shipbuilding Co. Ltd.	A34
B. P. Trading Ltd.	A69
Britain Steamship Company Ltd.	A27
Britannia Steam Ship Insurance Association Ltd.	A92
British & Commonwealth Shipping Ltd.	A38
British European Airways	A74
British Maritime Trust Ltd.	A64
British Sailors Society	A60
Brooke Marine Ltd.	A57
Brown Ltd., A. & R.	A62
Brown & Co. (Marine) Ltd., George	A95
Brown & Co. (Clydebank) Ltd., John	A59
Burnes Ltd., C. W.	A28
Caird & Rayner Ltd.	A12
Caledon Shipbuilding & Engineering Co. Ltd.	A11
Clyde Navigation Trust	A45
Coast Lines Ltd.	A77
Cochrane & Sons Ltd.	A10
Cockerill-Ougree, S.A.	A23
Comet Pump & Engineering Co. Ltd.	A56
Consett Iron Company Limited	A79
Copenhagen, Port Authority	A16
Cory Brothers & Co. Ltd.	A46
Cory & Son Ltd., Wm.	A69
Crosthwaite & Son, William	A63
Cunard Steamship Co. Ltd.	A22
Decca Navigator Co. Ltd. (Auto Pilot)	AB4
Denny & Bros. Ltd., Wm.	A54
Dixon Corbitt Ltd.	A58
Dowie & Co. Ltd.	A48
Drammen Slip & Verksted	A90
Duff & Co. Ltd., T. L.	A93
Dundee Harbour Trust	A28
East & Son Ltd.	A72
Federal Steam Navigation Co. Ltd.	A25
Furness Shipbuilding Co. Ltd.	A15
Furness Withy & Co. Ltd.	A22 & A97
Gdynia America Shipping Lines (London) Ltd.	A20 & A86
Gee & Co., Charles	A96
G.E.N.E.M.A. (French Shipyards)	A78
General Steam Navigation Co. Ltd.	A24
Gibson & Co. Ltd., E. A.	A74
Glen Line Limited	A20
Gray, Mackenzie & Co. Ltd.	A30
Gracie, Beazley & Co.	A32
Greenock Harbour Trust	A42
Grey, Charles C.	A46
Grimsby, County Borough of	A18
Halal Shipping Co. Ltd., The	A26
Hall Brothers Steamship Co. Ltd.	A54
Harland & Wolff Ltd.	A89
Harrison Ltd., Thos. & Jas.	A30
Hastie & Co. Ltd., John	A61
Hawker Siddeley Aviation Division	A73
Hawthorn Leslie (Engineers) Ltd.	A94
Hawthorn Leslie (Shipbuilders) Ltd.	A94
Hellenic Shipyards Co. Ltd.	A4
Holland-America Line	A26
Holoplast Limited	A88
Houlder Brothers & Co. Ltd.	A32
Humber Electrical Engineering Co. Ltd.	A84
Killick Martin & Co. Ltd.	A50
Kincaid & Co. Ltd., John G.	A80
Kockums Mek. Verkstade A/B	A65
Lamey Ltd., J. H.	A10
Lavino Shipping Co.	A94
Leather Institute, Furniture Upholstery	A18
Leigh Ltd., W. & J.	A91
London Authority, Port of	A39
Low & Sons Ltd., Archibald	A5
MacTaggart Scott & Co. Ltd.	A99
Maierform, S.A.	A58
Malone Instrument Co. Ltd.	A95
Manchester Dry Docks Co. Ltd., The	A14
Manchester Liners Ltd.	A67
Manganese Bronze & Brass Co. Ltd.	A83
Marconi International Marine Communication Co. Ltd.	A3
Marinens Hovedverft	A16
Maritime Insurance Co. Ltd.	A50
Marwood & Robertson Ltd.	A48
M.E.P. Co. Ltd.	A81
Mersey Docks & Harbour Board	A48
Mersey Insulation Co. Ltd.	A52
Metcalf Motor Coasters Ltd.	A93
Metcalf & Sons Ltd., T. J.	A93
Miller & Son, T. R.	A70
Milwaukee, Board of Harbour Commissioners	A34
Mitsui Shipbuilding & Engineering Co. Ltd.	A87
Morier & Co. Ltd., Wm.	A94
Mountstuart Dry Docks Ltd.	A40
Nakskov Skibsvaerft	A35
New Zealand Shipping Co. Ltd.	A25 & A96
Nirex Ing. A/S	A90
Nordenfjeldske Steamship Company	A24
Northern Ireland Trailers Ltd.	A58
Pacific Steam Navigation Co.	A36
Palm Line Limited	A37
P. & O., Orient & B.I. Companies	A31
Peter Brotherhood Ltd.	A17
Philip & Son Ltd.	A56
Polfracht Shipbroking & Chartering Co.	A86
Polish Steamship Company	A20
Port Line Ltd.	A96
Port of Preston Authority	A96
Potter Ltd., J. D.	A96
Pratt Brothers (Stourbridge) Ltd.	A56
Priestman Brothers Ltd.	A12
Prince Line Ltd.	A93 & A97
Radcliffe & Co. Ltd., Evan Thomas	A92
Raine & Co. Ltd.	A93
Rankin & Blackmore Ltd.	A53
Readhead & Sons Ltd., John	Back Cover
Reliance Marine Insurance Co. Ltd., The	A52
Rethymnis & Kulukundis Limited	A92
Riley Limited, Robert	A8
Robinson, David & Co. Ltd.	A64
Robb Limited, Henry	A82
Round Oak Steel Works Ltd.	A2
Rowbotham & Sons (Chartering) Ltd., C.	A86
Royal Mail Lines Ltd.	A36
Rutherford & Son, John	A95
Saunders-Roe Ltd.	A13
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Spanner Boilers Ltd.	A49
Springbok-Houston (Loading Brokers) Ltd.	A96
Steels Engineering Installations Ltd.	A5
Stephens & Sons Ltd., Alexander	A7
Sterling Offices Limited	A60
Stevinson Hardy & Co. Ltd.	A62
Stothert & Pitt Ltd.	A42
Sutcliffe & Son (Grimsby) Ltd., John	A24
Sunderland Steamship Mutual War Risks Association Ltd.	A95
Sunderland Steamship Protecting & Indemnity Association	A95
Swan, Hunter & Wigham Richardson Ltd.	A76
Taylor & Co., Charles	A64
Tees Towing Company Limited	A63
Telford, Grier, MacKay & Co. Ltd.	A6
Thermotank Ltd.	A82
Thomson & Co., Wm.	A50
Thurley & Co. Ltd.	A96
Tindall, Riley & Co.	A92
Trent Valve Co. Ltd., The	A14
Tyne Board Co. Ltd.	A41
Union Castle Line	A38
United States Lines Co.	A21
Vickers-Armstrongs (Shipbuilders) Ltd.	A29
Walker Sons & Co. Ltd.	A94
Watson (Shipping) Ltd., Thomas	A60
Watts Shipping Company Ltd., The	A27
Watts Watts & Co. Ltd.	A27
Websters Ltd.	A95
Weir & Co. Ltd., Andrew	A33
Weir Ltd., G. & J.	A75
Westminster Dredging Co. Ltd.	A66
Yarwood & Sons Ltd., W. J.	A94

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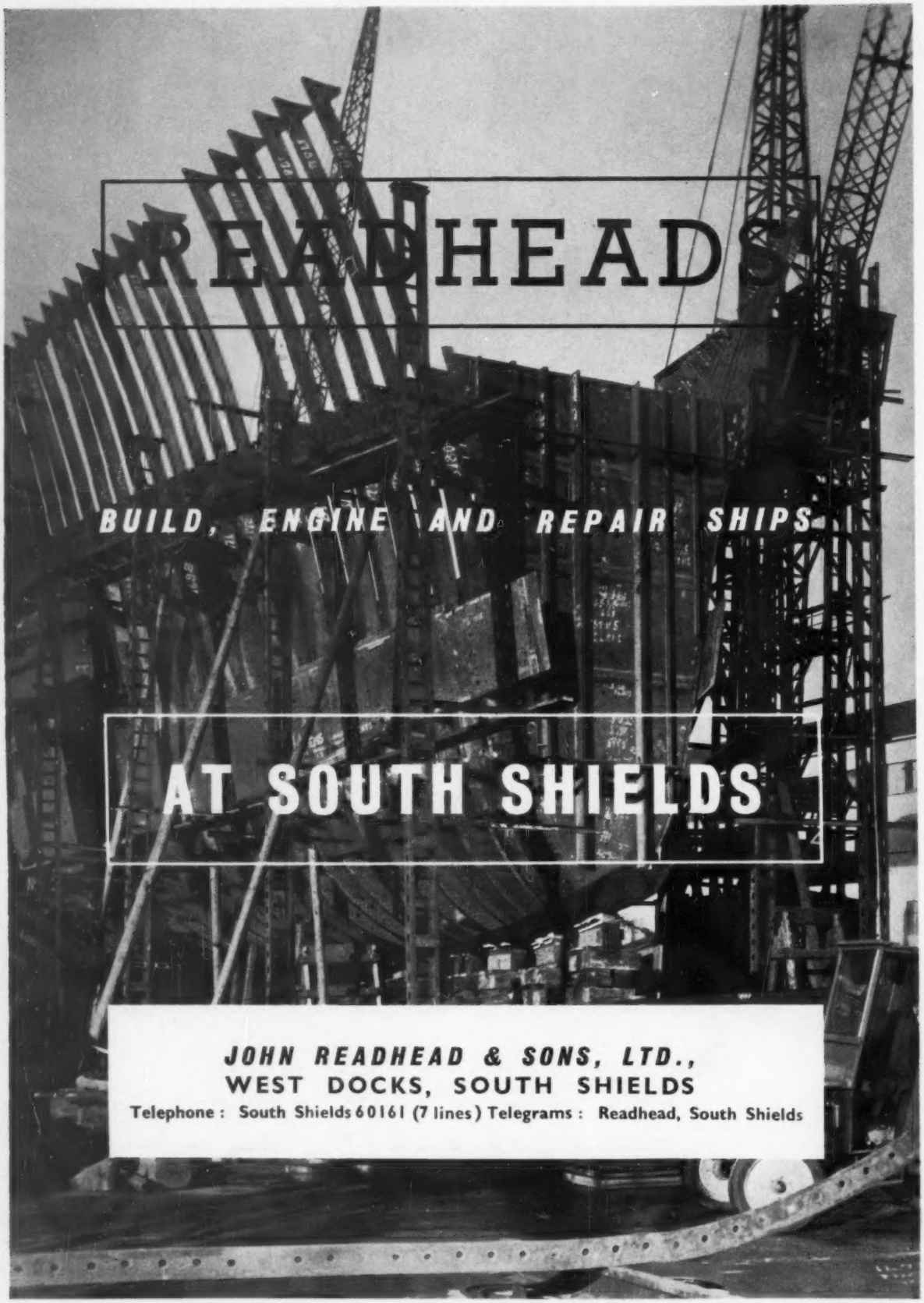


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